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The President's New Year Message

THROUGH the courtesy of the Editor I am writing on behalf of Mrs. Robertson and myself to wish every member of the British Veterinary Association a most happy and prosperous New Year; may they look backward with satisfaction and forward with confidence. The affairs of our own Association have prospered and the turn of the year sees the largest and most representative membership in its history. So, too, has the reputation and prestige of the whole profession advanced, as it will continue to advance, I am certain, in the year that lies ahead.

The year just past has provided several landmarks in the long story of the B.V.A. The Report of the Departmental Committee on Foot-and-Mouth Disease endorsed emphatically the views of our Association on the policy for dealing with that disease in this country and also paid a well-deserved tribute to our State Veterinary Officers and to our research colleagues. The first Act of Parliament ever to be sponsored by us—the Animals (Anaesthetics) Act—safely reached the Statute Book. The work of our Euthanasia Committee has been brought to a successful conclusion with the co-operation of several outside bodies, including the Universities Federation for Animal Welfare and the University of Glasgow, to whom our special thanks are due for the assistance given us in solving a problem of crucial importance We have spent our first year at Mansfield Street and if the remaining 998 years of our lease there are as successful as the first, we shall have every reason for satisfaction. A new Division—the Essex Veterinary Society—has joined us, and we welcome their members very warmly, while we are also glad to have an additional affiliated cadet branch in the Association of Veterinary Students.

The year had its problems also, some of which still face us in 1955. As a profession we have yet to achieve the status in meat inspection that we feel to be our due. Negotiations with the Animal Welfare Societies are continuing, and those who have contributed to the correspondence under "A Legitimate Grievance" may be assured that their representatives both from the B.V.A. and the Royal College are fully aware of the disabilities under which they and their colleagues in small-animal practice are labouring. These are but two among the many issues that call for our further attention. They can only be brought to a successful conclusion, together with our other problems, by the steadfast adherence of every member to our professional motto, *vis unita fortior*. Let us, therefore, go forward, confident and strong, and above all united into the New Year, and may good health, good luck and prosperity be the lot of one and all in 1955.—ALEX ROBERTSON.

THIRTEENTH CONGRESS PAPER

Scientific Trends in Milk Production in Great Britain

BY

J. EDWARDS

Production Division, Milk Marketing Board

This paper was discussed on Friday, September 24th. Mr. P. Sutcliffe was in the chair, and the Recording Secretary was Mr. A. F. Holt.

THE Chairman, in the course of his opening remarks referred to the fact that Dr. Edwards had started his career as a research worker at Cambridge. He had now moved into one of the key positions in the dairy industry. That was a very fortunate circumstance because, although he was handling a very big business, he had never lost his scientific outlook and willingness to share information and facts. It was encouraging to know that there was a person with his training in this important executive position.

Dr. Edwards's paper dealt with scientific trends as related to the dairy industry. Farmers, up to about two years ago, had enjoyed a rising crescendo of prices. Any mistakes that were made as regards efficiency or policy were easily digested in the following year's increase in prices, so that they did not need to worry about being very careful or efficient. That position had now changed. Prices, although they had not slumped, were exhibiting a downward tendency, which was likely to continue in the absence of international conflict. With milk at 3s. a gallon, it looked as though the market was going to be limited, but if milk could be produced profitably for 2s. a gallon, the market was probably capable of absorbing all that could be produced. This was what really lay behind Dr. Edwards's subject. It came at the most opportune moment, and was of course of considerable concern to the veterinary profession, whose interests were very much bound up with those of the dairy industry.

Dr. Edwards said that he was very glad to be present. He took it that they had read all or part of the paper, and in introducing it he thought the best thing to do was to show the slides because they spotlighted some of the main features of the paper. It might help their memories if the facts were seen again.

THE PAPER

As Dr. Edwards indicated, his paper had been circulated previously. It was as follows:—

Introduction

AS a result of my many connexions with the British Veterinary Association, I am only too well aware that when a paper on scientific trends in milk production in Great Britain is asked for it *means* Great Britain and my only reason for tending to concentrate, as will be seen, on conditions in England and Wales is that I know more about them. I am certain that members who have come from other parts will be well able to fill in the gaps.

To see where we are now—and to try to predict where we are going—it will pay us to take a look at our past.

Milk production, for reasons which we all know, received a great stimulus during the war. The price incentive was used to the full and the industry received "most favoured" treatment. The pre-war interest in milk as a top priority food, encouraged by studies by Lord Boyd Orr and by such practical schemes as milk-in-schools and factories sponsored by the Milk Marketing Board, was developed by the State through its Ministry of Food, with the result that the population of our islands joined company with those of other leading milk-consuming nations, *e.g.*, the United States and the Scandinavian countries. From a weekly per caput consumption of 3 pints in 1939, the quantity rose to 5 pints in 1953.

This was made possible by a vast increase in the quantity of milk coming on the market. Table I Slide I shows what has happened:—

TABLE I

	Volume of milk sold (million gallons)		
	1939	1943	1953
England and Wales	1,123	1,157	1,635
Scotland	136	132	209

The value of milk sold in England and Wales in 1953 was £250 millions, the largest sum obtained for a single product in our agricultural economy. This development, as all will agree, has brought prosperity and stability to our countryside and no one will wish to see a return to the depressed and unorganised state of the industry of the early 'thirties.

I do not wish to become involved in an argument about whether we now have plenty or too much milk, or whether the time has come to transfer the emphasis in a drastic way to other forms of agricultural production; but we have, I think, to face the fact that those in charge of price-fixing have set a limit to the volume of milk to which the full guarantee will apply (1,651 million gallons for England and Wales) and that from now on the price which

the producer receives will be the blend of this and the price that is realised for milk sold for manufacturing.

Table/Slide II shows how the proportions of liquid and manufacturing milk have varied in the past 14 years :—

TABLE II

	Milk sold (million gallons) for (a) liquid consumption & (b) manufacturing		
	1939	1943	1953
England and Wales	(a) 760 (68%)	1,027 (89%)	1,342 (82%)
	(b) 363 (32%)	130 (11%)	293 (18%)
Scotland	(a) 88 (65%)	109 (82%)	141 (67%)
	(b) 48 (35%)	23 (18%)	68 (33%)

The tasks before the industry are therefore two-fold—to continue, by every means open to a large food industry, to maintain and increase the consumption of liquid milk and to market milk for milk-products to the best possible advantage. The former is reasonably secure from outside competition, but the same is not true of the latter. However, to be safe in both markets the industry's first concern in its attitude to trends in production must be to see to constantly improving efficiency in output. In discussing trends in production, I wish to do so under the three conventional headings of breeding, management and disease control.

Breeding

Whether you regard artificial insemination as a scientific trend with innate potentialities or a technical process which makes for economy in such things by getting cows in-calf and helping to control disease—and my own opinion is that it is some of each—it must be regarded as a most significant development. In not much more than a decade A.I. has, in spite of all predictions to the contrary, come to be accepted as a normal method of breeding by more than 147,000 farmers in England and Wales, 7,500 in Scotland and 7,000 in Northern Ireland. The rate of growth of the movement at Board centres in England and Wales is shown in the following Table/Slide :—

TABLE III

	No. of members	No. of cows inseminated
1944/45	360	2,599
1945/46	922	6,401
1946/47	4,420	25,535
1947/48	12,766	90,173
1948/49	33,249	256,054
1949/50	53,908	431,370
1950/51	70,966	567,158
1951/52	87,917	706,845
1952/53	101,720	847,942
1953/54	115,516	1,020,706

The proportion of cattle bred by A.I. in England and Wales is now 43.8 per cent. In some areas it is much higher, being, for example, 80 per cent. in Cornwall, 82 per cent. in Devon and 75 per cent. in South Wales. Nor is there any indication, so far, that expansion has come to an end. It is perfectly possible that more than two-thirds of our cattle will be bred by A.I. within the next decade —*i.e.*, 2,000,000 out of the national herd of 3,000,000.

In the sphere of breeding the two main contributions of A.I. to increased productivity are (a) the ease with which breed changes may be effected and (b) the new field opened up for the selection of breeding stock of real genetic merit.

In "breed change" I include a long-term policy decision to change to single-purpose, dual-purpose or Channel Islands breeds for the special merits which each possesses (Table/Slide IV.)

TABLE IV

BREED YIELDS : NATIONAL MILK RECORDS 1952/53

	Milk Yield (lb.)	Fat %	lb. Fat
Friesian	9,382	3·51	329
Ayrshire	8,249	3·86	318
Shorthorn	7,661	3·59	275
Red Poll	7,519	3·64	274
Guernsey	7,344	4·59	337
Jersey	7,010	5·08	356

Marketing conditions during and since the war have given a considerable impetus to breeding for yield and, to a lesser extent (by quality premiums) to breeding for Channel Islands milk, both at the expense of the dual-purpose breeds. The prices for pedigree breeding stock, which have remained at a high level for many years, would, in the absence of A.I., have put a brake on the rate of these changes. With A.I. they have been rapid. In 1952, whereas approximately 60 per cent. of all bulls (not including beef breeds) licensed in England and Wales were "dual-purpose," more than 85 out of every 100 dairy inseminations carried out by Board centres were with single-purpose breed semen (Table/Slide V).

We estimate that, in the increase in yield which has occurred over the past ten years, one-quarter is due to this factor of breed change.

Government policy, as exercised through such schemes as free beef inseminations (1948-1950), calf subsidy and beef prices, can also influence breed changes of a less permanent nature. A.I. statistics demonstrate how such policies may affect the demand for beef semen from season to season. That his needs can be met very quickly (by A.I.) is very convenient for the producer, who is as suitably placed for meeting the market as the pig-breeder of pre-war days who used boars of porker or bacon breeds according to the state of the two markets. And he (the A.I. user) has at all times open to him the opportunity to inseminate his heifers and his low-producing cows with beef semen.

TABLE V
BREED DEMAND (M.M.B. A.I. CENTRES) 1953/54

	No. of inseminations	Proportion (Breed)	Proportion (Group)
Single-purpose			
Friesian	419,093	48·1	
Ayshire	113,078	13·0	61·1
	532,171		
Channel Island			
Guernsey	60,643	7·0	
Jersey	40,086	4·6	11·6
	100,729		
Dual-purpose			
Shorthorn	164,943	18·9	
Devon	37,700	4·3	
Lincoln Red	11,796	1·4	
South Devon	8,360	1·0	
Red Poll	8,237	0·9	
Welsh Black	7,100	0·8	27·3
	238,136		

Genetics

These advantages are the result of the spread of a technique. We feel, however that even greater advantages are about to be derived in the field of fundamental genetic progress. Genetic thought, applied to dairy cattle breeding, is in a state of uncertainty at the present time due to the results, sometimes conflicting, of studies of the yields of A.I. progeny and to the almost nihilistic conclusions reached by precise drosophila geneticists who enter the field and are appalled by the large and elusive environmental differences in it.

Before we consider these matters, I should like to quote from the introduction of a paper by Falconer, in which is described a classic experiment on selection for large and small size in mice. Falconer says, "In the study of the genetic control of continuously varying characters, theory has far outstripped experiment and there is now a widely felt need for more experimental work in order both to check the validity of the theory and to disclose new phenomena." The animal improver of to-day is caught in a crossfire between the theories of the modern geneticist, who moves from drosophila genetics to large animals with surprising ease, wrapping his concepts in high-powered statistics on the way, and the traditional private breeder whose beliefs are sometimes blessed and ritualised by his breed society. Neither speaks the same language or, where he does, means the same thing. Yet a common meeting ground has to be found.

An economist, in a moment of unusual candour, said recently that economic prediction was not yet a science; that it lay in the intriguing hinterland between what could be described as a pure hunch and a third-rate skill. The animal geneticist would say that this could equally well describe the state of most pedigree breeding methods, including his own. As evidence he would instance the very slow rate of progress, generation by generation, in our pedigree herds; and he would show, by studies of breed structures and the rate at which genes move through the breed from the "best" herds to the rest, that the "blood" in the latter is not so very different from that in the former. (He might concede real genetic superiority in individual herds over a period, but he would attribute this to the chance appearance of one or more outstanding sires rather than to design.) And because of his estimate of the movement of genes through a breed (the dilution effect), he would go so far as to say that, on the average, of the difference in yield between a 500 gallon herd and one yielding 1,500 gallons, not more than 100 gallons was due to superior inheritance in the latter. He could quote also the yield results of the progeny of the first bulls to be used in A.I., showing them to be little better or worse than the progeny of other bulls (by natural service) in the same herds and, perhaps more remarkable, demonstrating how closely the yields of a bull's daughters are "tied" to the level of management in the herd in which they happen to be born; *i.e.*, when the level is 500 gallons the bull's daughters will be 500 gallons; where it is 1,000 gallons they (same sire) will be 1,000 gallons. (There is a partial consolation here in the fact that the fears have proved unfounded that the use of superior A.I. bulls in poorly managed herds would result in progeny that would milk themselves to death. They appear to have taken T. H. Huxley's advice to "adapt" rather than "perish".)

It is good to have nice theories and concepts shaken to their foundations from time to time, if only to make one question what it all means and what is to be done about it. As to what it means, I think the answer is that we must agree that milk yield, being subject to an enormous complex of environmental influences, has an inheritance that is much more difficult to establish than, say, an early developing character such as the length of the cannon-bone in the horse, which is fixed by the time the foal is born. In other words, the heritability of milk yield is low. As a result, we should not fool ourselves that we can make spectacular advances and we should take steps to see how we may improve our methods of selection. But this is far from saying, as some would appear to say, that private breeders and their breed societies have contributed little or that there is next to nothing in heredity.

As to what is to be done about it, we are able to improve matters by the very kind of studies which have revealed the deficiencies of earlier methods. The days of selection of a bull on a dam's record, or this combined with records of his grand-dams, are over; and the days of selecting him either on his progeny-test by averaging his daughters, or making daughter-dam comparisons, or by using such additional records in the pedigree of a young bull, are numbered. We simply have to pay more attention to the environment in which the records are made and, thanks to the wide range of environment over which an A.I. bull may be tested these days, we seem now to be getting somewhere.

Relative Breeding Value

I shall not bore you with details, but a few slides will show the new method by which, as a result of a comparative test—the bull's daughters against their contemporaries in the same herd in the same season—and by adjustments for numbers, herd-weighting, heritability, and a comparison with the "population" (county) breed average, a Relative Breeding Value may be calculated for each bull. An R.B.V. of 100 means that the bull is transmitting at the level of his breed; 90, at 10 per cent. below the breed average; and 110, at 10 per cent. above. So far our highest R.B.V. is 140 and our lowest 77.

R.B.V.'s are subject to adjustment as more daughter records come in, but a Value is not likely to change greatly after 50 to 75 daughter records have been made in a reasonable number of herds. Amid much uncertainty, this is something to hold on to and our aim is to use the very best bulls to breed bulls. A similar treatment of dams' records makes possible the use of R.B.V.'s for sires and dams to predict the R.B.V.'s of young bulls which will form, at an increasingly high level of selection, the main strength of the breeding stud.

Do not think for a moment that this means "breeding blind" on paper. It does not. Many—A.I. breed panels and Board staff and Ministry staff—will continue to pay attention to other factors important in selection. It does mean, however, that we think we see our way to make use of records—of a kind and on a scale not previously available—to overcome some of the problems that surround the identification of real genetic merit.

Fortunately the trend in scientific breeding for butterfat production is more easily shaped, as we know from our own experience and that in other countries. (The heritability of butterfat is much higher than that of milk yield.) It is largely a question of the aim or target and here it would be rash to predict what this might be while the world market for butterfat and the consumer's taste for high fat milk is in a state of flux. What we do know, from studies we have made, is that a reasonably high fat test is not incompatible with high yield. The following table/slide shows the range for heifers of three of our main breeds :—

TABLE VI

RELATIONSHIP OF FAT PERCENTAGE TO MILK YIELD (FIRST CALF HEIFERS)

	Friesian		Ayrshire		Shorthorn	
	No. of animals	Fat %	No. of animals	Fat %	No. of animals	Fat %
Under 5,000	1,708	3·58	1,531	3·95	2,253	3·65
5,000	1,405	3·58	1,393	3·96	1,896	3·65
6,000	2,354	3·56	2,123	3·93	2,400	3·64
7,000	2,862	3·54	2,360	3·93	1,952	3·60
8,000	3,123	3·53	1,941	3·90	1,112	3·56
9,000	2,536	3·50	1,103	3·84	446	3·54
10,000	1,677	3·53	589	3·81	191	3·46
11,000	979	3·43	178	3·72	46	3·53
12,000	518	3·39	49	3·62	7	3·23
13,000 & over	435	3·33	34	3·61	5	3·65

I will say little about solids-not-fat which, as we know, are fairly closely correlated with the fat content of milk. In breeding it would be almost impossible to improve one at the expense of the other, though if circumstances were such that s.n.f. came to be more important than butterfat, then an attempt would have to be made to select especially for it.

I apologise for devoting so much time to the breeding section of this paper and, in extenuation, I can only say that I have done so for two reasons; first, because, as we all realise, breeding is absolutely fundamental, and second, because I believe that, with the material now made available by A.I., we are at the beginning of a new era of progress.

Management

The new approach to breeding which I have described—with its "deflationary" effect as regards the prospect of rapid genetic gains—has simultaneously illuminated the field of management for production to show the large amount of improved cultivation that is possible. The Friesian breed, for example, averages about 880 gallons a recorded cow at the present time. Going to make this average there are some herds that yield 500 gallons and others which, for several years on end, have produced 1,500 to 1,800 gallons. We now know that the main cause of this very substantial difference is not genetic but is due to differences in management, which include everything done on the farm for and to the dairy cow.

Some might say that we did not require the new genetic approach to come to such a conclusion and it is true that we have many examples of outstanding improvements in productivity which, because of the short period of time in which they have been brought about, cannot possibly be attributed to breeding. Take, for example, our analysis of 511 Friesian herds recorded continuously for 10 years (1942-1951). (Diagram/Slide.)

The *average* increase in yield over the period was 215 gallons yet, as the diagram/slide shows, eleven herds at the lowest level of production at the beginning of the period improved by nearly 400 gallons. Breeding could not claim credit for this in a decade. The increase in ten years is seen to be smaller with each rise in the starting point until, at the highest level, we find another eleven herds that are just holding their own.

Or we might take an example from a single farm belonging to one of our A.I. members whose records of production over seven years were as follows :— (Table/Slide.)

It would be very tempting to say that this spectacular improvement was the result of one top-cross of superior A.I. bulls; but we know that it is much more the result, stimulated by the A.I. start on the ladder of herd improvement, of a new interest in all the well-known practices of good husbandry, such as better pastures, better rearing methods and disease control (attestation, use of S.19, etc.).

Perhaps the best example of the fact that the genetic ceiling of our cattle is largely unexplored—that we are, in fact, a long way off the "yield bar-

rier"—is to be found in a classic feeding experiment conducted in Denmark, when 10 of the best cows from a large Danish Red herd, already very well managed, were selected for an all-out effort or, as our American friends would say, the "full treatment."

In the recording year 1949-50, the average yield per cow in the herd of 119 cows (from which the ten cows were taken) was :—

Milk (lb.)	*Fat per cent.*	*lb. Butterfat*
13,748	4.42	606

In the experiment the ten cows were fed four times a day and the quality and palatability of the concentrates and roughages were given special attention. Over the year the average consumption per cow was 8,871 lb. concentrates, 17,868 lb. roots, 4,870 lb. silage and 2,352 lb. hay. The cowshed was well ventilated and the temperature was kept at 14 to 15° C. (Silage and fodder beets were fed at this temperature). At the end of the year's experiment the ten cows averaged :—

Milk (lb.)	*Fat per cent.*	*lb. Butterfat*
22,200	4.64	1,031

and they put on nearly 1½ cwt. bodyweight in the process.

Incidentally, results like these must make us marvel at the nature of the gene content (for yield) of our cattle. For many thousands of years they have, by natural selection, been evolved for one purpose—to give enough milk to suckle a calf. (Breeders of range-cattle will tell you that this should not be more than about 350 gallons if udder troubles are to be avoided.) For less than 100 years—a period too short for major selection gains or mutations of consequence—we have been consciously selecting for milk for human consumption and we find that genes for 3,000 gallons have been there all the time. This should be a sobering thought for those who are afraid of "loss of genetic flexibility" by to-day's breeding methods.

TABLE VII
HERD AVERAGES

Year	Cows			Heifers	
	Yield in lb.	No. in average	Calving index	Yield in lb.	No. in average
1949–50	10,526	22	370	6,725	11
1948–49	10,039	23	375	6,549	7
1947–48	7,717	22	378	7,489	11
1946–47	7,115	31	374	5,603	4
1945–46	6,893	28		5,735	10
1944–45	6,237	22		4,938	7
1943–44	5,623	14		4,329	3

As a result of the emphasis on milk production in recent years, we are now (England and Wales) catching up on other countries, *e.g.*, Denmark and Holland, which have a longer dairying tradition. In terms of output a cow, the following graphs show the size of the gap still to be closed.

We estimate that it amounts to 100 gallons compared with Denmark and 190 gallons compared with Holland.

Of course, in our older dairying areas in this country we have yield levels that compare favourably with any; but here again, as with the 511 Friesian recorded herds mentioned earlier, the gap is closing. The newer areas are catching up. (Table/Slide.)

TABLE VIII
AVERAGE RECORDED YIELDS

	1942	1952
Specimen old dairying area	6,924	7,951
,, main ,, ,,	6,695	8,059
,, new ,, ,,	6,451	7,715

In this all-important matter of better management, I do not think we any longer believe that it is merely a matter of feeding 3½ to 4 lb. concentrates per gallon and culling the poor yielders. If it were

FIGURE A

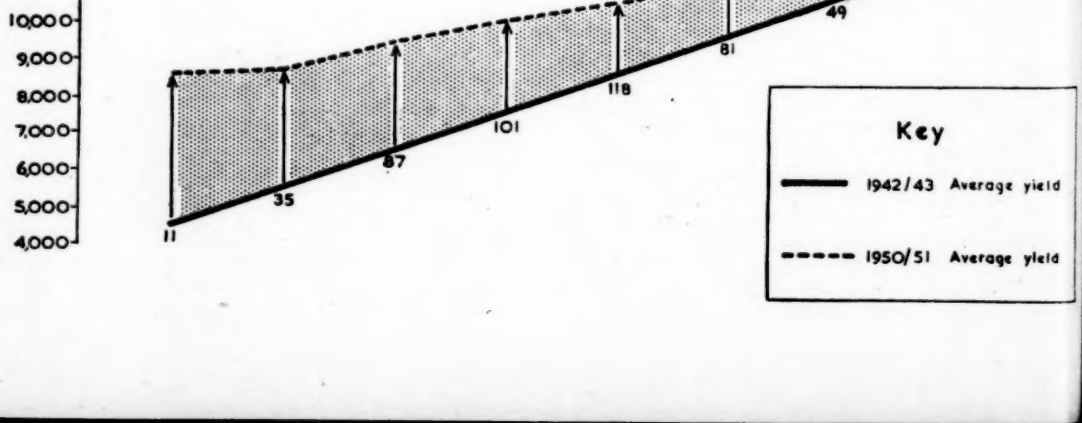
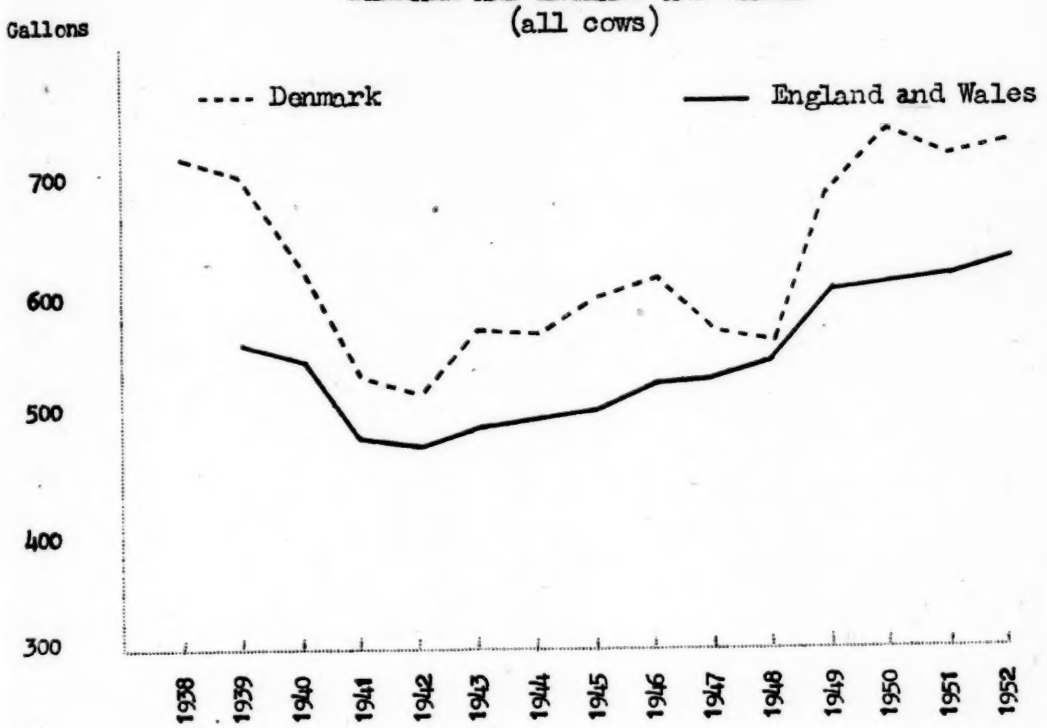


FIGURE B

COMPARISON OF AVERAGE ANNUAL YIELD A COW

DENMARK AND ENGLAND AND WALES

(all cows)

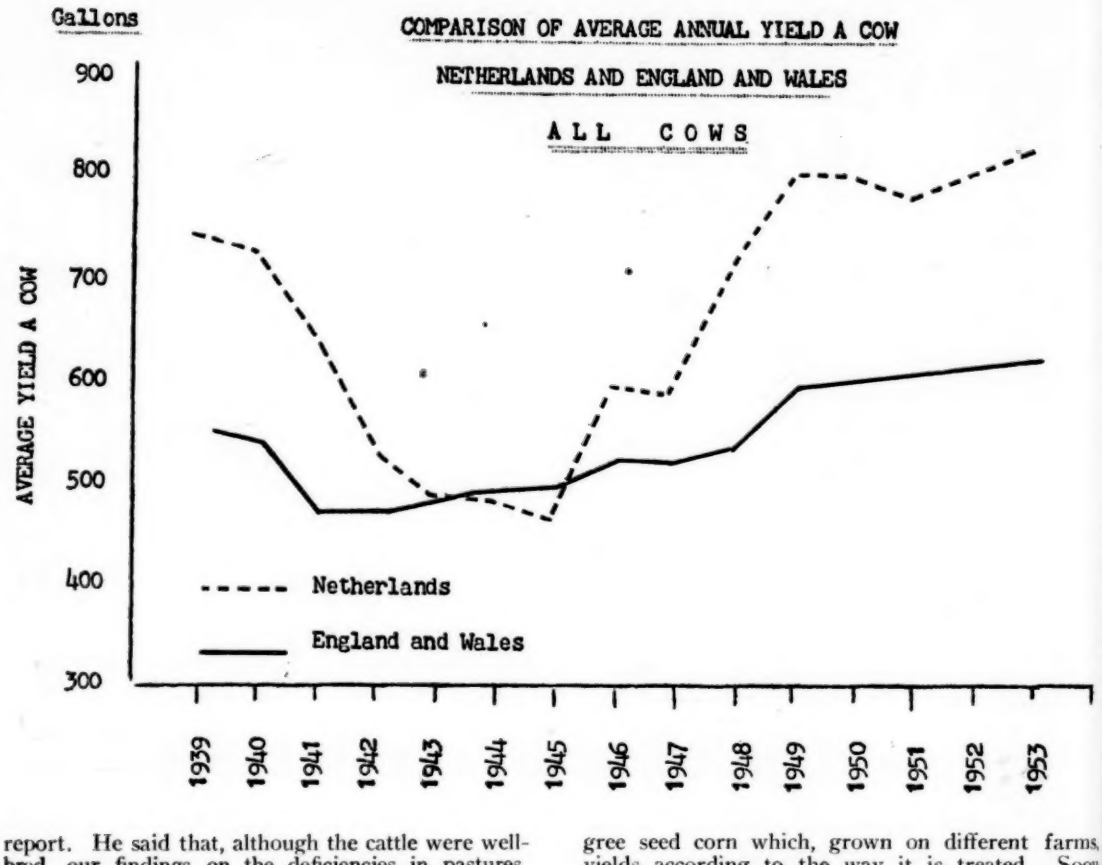


Bobby Boutflour would not be alone in his glory, for none would reject the high profits a cow which he is making. The rest of us simply haven't got his skill and we must try to find out what it consists of. Nor do I think we (or he) help matters by becoming attached to extreme schools of thought—in the realm of feeding, for example, to emphasize all roughage or all grass—as if one or other was the only key to open the door. This confusion leads to more—for example, the argument (which I am sure is entirely academic) that there is something in breeding our cows for one or other of these systems of feeding.

It is surely better to consider the system of farming suited to our circumstances and then try to apply the best practices of its most expert exponents. If our target is a 1,200 gallons herd average, we have many in this country to show the way on concentrate feeding. In New Zealand we can find how to get the same result with exactly the same cows on grass and silage and in Denmark we can see how to reach it on quantities of roots and bulky fodder—and the Danes know what they are doing—which would render Bobby Boutflour speechless.

There are other and more elusive factors affecting yield which strike us from time to time to remind us of the scope of what we call environmental effects. Two came to our notice on our recent tour of New Zealand. The first, on a well-run pedigree farm, was something as simple as a change to a new milking-shed built in the same yard as the old one. (The new shed should have been completed before the annual calving of the herd in spring but there were delays and the change-over came about one month after calving.) Everything—staff, milking machines and herd management—remained the same but the strangeness of the shed (in which each cow spent a fraction of each day at milking time) caused a reduction in yield in the year of 15 per cent. The loss of income was greater than the cost of the shed. The other example illustrated the most elusive factor of all—good stockmanship. Towards the end of our tour we were taken to a farm on which we found none of the "good practices," such as controlled grazing, liberal phosphate dressings and silage conversion which we had seen on all other high-producing farms and yet the productivity, per cow or per acre, was in the very highest class in New Zealand. The only striking feature was the "harmony" between the owners (father, son and daughter) and their cattle. We were so puzzled that we asked the New Zealand Dairy Board to arrange for a detailed survey, by one of its Consulting Officers, after our departure. In due course we received his

FIGURE C



report. He said that, although the cattle were well-bred, our findings on the deficiencies in pastures, methods, etc., were correct, as was also the record of the very high output which we had abstracted from the herd registers. As to this high output, he concluded, ". . . and there is every reason why it should *not* be possible." Apart from good breeding, the explanation appeared to be excellent "milking-shed technique," meaning sympathetic handling at milking-time. What these owners would achieve with their herd on some of the best pasture farms we visited is something we could only imagine.

There is no time here to discuss other factors—less important in themselves, but all "additive"—which we have examined; for example, the effect on yield of age at first calving and also the seasonal effect. Such studies are constantly in progress and results are published from time to time in our Production Division Reports.

We see—at least I have attempted to show—that the scientific trends in breeding and management are complementary and that each has its own definite field and aims. I shall conclude this section by drawing attention to an important change being made by the widespread use of artificial insemination. The A.I. centre is like the distributor of pedigree seed corn which, grown on different farms, yields according to the way it is treated. Soon hundreds of dairy herds in an area will be as similar in their breeding as corn out of the same pedigree sack and their herd outputs will measure the level of management to which they are subjected.

Animal Health

There are many more able and better placed than I to describe the effect upon milk production of such massive concepts as the eradication of tuberculosis and the control of contagious abortion and mastitis. Dr. Stableforth has reviewed the field only recently (at the Farmer's Club) and so to-day I think I shall confine myself to what is new in the material and information coming from our A.I. centres.

To-day we possess factual breeding records for 150,000 herds, which is something new in scientific book-keeping. With the help of these we should be able to find out something about herd infertility. By going to a little extra trouble we are able to obtain and study results on more than one million cows a year. Having secured this information and having built up a system by which it is collected automatically, it is up to us to see that we make use of it.

Incidentally the system is capable of eliciting more than facts concerning fertility and sterility. Last year, in conjunction with Professor Blakemore and the Ilminster A.I. centre, we constructed a simple questionnaire on calf-birth phenomena and found that satisfactory and valuable statistics, previously unknown, could be compiled at short notice by answers given to inseminators on their rounds. And at no extra cost; for the inseminations paid the cost of the visit to the farm, which is always the most expensive part of any investigation. Perhaps Professor Blakemore will add to this in the discussion. It is a method of fact-finding which we have used in dairy husbandry "field research" and I am sure we can develop it in the veterinary field.

I believe the Agricultural Research Council has received funds for an investigation of losses caused by animal diseases. I do not know when the survey is likely to begin but I recommend the method I have described as worthy of study.

To return to what we have found from our records: I think one of our first conclusions—reached after only a few years of A.I. records—was that the herd and not the individual cow should be the "unit" of study in field conditions. In this connexion I think some of us were surprised that herd infertility was not more extensive and perplexed to find that it was so often very ephemeral. Out of several thousand herds all using the same semen one might pick and visit 20 to 30 with conception rates of 20—25 per cent., only to find that they were back to normal by the time one reached them. I am not minimising the seriousness of temporary infertility which lasts a few—or worse still—several months and which is all the more perplexing because a cause and cure cannot be found.

Nevertheless, I must say that I regard the cow as a member of a very fertile species and I think we should not overdo our concern for her breeding state. We know that she converts feed to human food more efficiently and in larger amounts than any other species; on top of this we now know (from millions of results) that there are two chances in three that she will conceive at the first opportunity. (A human conception rate at this level and the species would over-populate the globe.) I think too that we should be careful about the way in which new diseases or possible causes of infertility are "revealed" to the farmer—as well as new cures—because fears that prove to be unnecessary are often aroused and much needless expense may be incurred. We find examples of both as we go around.

On my desk I keep a list of theories or supposed causes of infertility and I add a new one almost every year. I realise that we are not alone in this proneness. A medical nutritionist recently told a meeting of doctors that when they surveyed the numbers and kinds of diets propounded by specialists over the past 50 years they must be honest with themselves and admit to surprise that the human race still survived.

The conception rates obtained by individual A.I. centres puzzle us and, although we are far from having all the explanations, I give the results for 24 centres over four years based on 3,000,000 cows (Table/Slide IX). At first sight the range is surprisingly wide—from 72½ per cent. at the best to 62½ per cent. at the worst, though each has had the same selection of fertile bulls. However, 14 of the 24 centres come within 2 per cent. of each other and it is really the exceptionally high conception rate at Llangefni (Anglesey) and the low conception rates of the lowest five centres which make the wide range.

TABLE IX

M.M.B. CENTRE CONCEPTION RATES, 1949–1953

Four year average—descending order Centre	No. of cows	Conception rate	Range
Llangefni	70,128	72·7	66·2—74·4
Penrith	86,398	70·5	69·2—72·4
Welshpool	130,537	70·1	69·3—70·8
Honiton Clyst ...	100,956	70·1	67·9—71·9
Cheswardine	183,957	70·1	69·1—70·6
Buxton	83,462	69·3	68·4—70·5
York	45,122	68·9	65·4—70·2
Tarporley	186,537	68·8	67·0—70·3
Gloucester	152,240	68·5	64·7—70·1
Torrington	152,657	68·3	66·0—70·8
Whalley	114,279	68·3	66·9—69·6
Carmarthen	289,116	68·2	67·2—70·2
Praze	173,393	68·1	66·9—69·0
Felinfach	94,424	68·0	66·8—70·5
Little Horwood ...	138,310	67·9	66·5—69·3
Burley-in-Wharfedale	60,971	67·6	65·4—68·6
Tean	132,480	67·1	64·7—67·9
Sutton Bonington ...	125,222	66·1	65·7—66·8
Sturminster Newton...	114,478	65·1	60·3—69·0
Chippenham	89,303	63·9	62·0—66·5
Whiligh	144,725	63·8	58·6—67·5
Beccles	146,737	63·6	62·2—64·5
Shincliffe	95,459	63·0	60,2—69·8
Writtle	64,843	62·3	59·7—65·8
Totals	2,975,734	67·6	66·8—68·4

The results of our studies on the effect of the length of the service period (time from calving to conception) on the conception rate have been published and confirmed elsewhere. (Table/Slide X.)

TABLE X

Days interval between parturition and first mating	No. of cows	Conception rate to first mating
0— 30 days	290	48·3
— 60 ,,	2,012	62·5
— 90 ,,	4,431	73·1
—120 ,,	3,068	71·5
—150 ,,	1,265	73·4
—180 ,,	619	69·7

A short service period reduces the chances of conception from two in three to evens; this may be all right for the farmer who is trying to catch up with the timing of his herd calvings, but it would be expensive for the A.I. movement if indulged in. (Last year a fall in the national conception rate of about 1½ per cent. meant 30,000 additional free repeat inseminations and an extra distance to be travelled of nearly 250,000 miles.)

On the male side of infertility I think we are exactly where we were when A.I began, *i.e.*, we do not know how to influence sperm production for better or worse. I think this may be due to the failure to adopt research techniques that have proved successful with small animals and partly also to the large confusing effects of environment and temperament upon the nature of semen samples. About the only certain "lead" we possess in the field of quantitative spermatogenic studies (as distinct from a voluminous literature on the qualitative side) is the rabbit experiment* (on unilateral castration) which showed the very close correlation between weight of testes material and numbers of sperm produced. (Table/Slide XI and Figure/Slide D.)

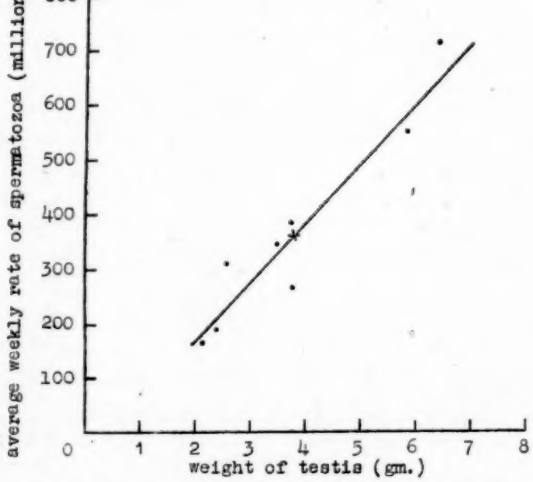
TABLE XI

No. of Animal	Weight of testis or testes (gm.)	Average no. of sperm produced weekly (millions)
1 (E)	2·17	165
2 (E)	2·40	195
3 (E)	2·60	314
4 (E)	3·60	345
5 (C)	3·77	385
6 (C)	3·80	261
7 (C)	5·90	546
8 (C)	6·48	709
Average	3·84	Average 365

E = Experimental : 1 Testis. C = Control : 2 Testes.

FIGURE D

Relation between weight of testis and rate of spermatozoa production.



This lead is now being followed up in the United States of America, not only as a basis for quantitative concepts in commercial semen production but also, by relating rate of production in the testis to rate of flow in the epididymis, as a method of testing the properties of semen samples from one and the same bull and why they vary so greatly in longevity, fertilising capacity and resistance, *e.g.*, to very low temperatures.

A final word—on bull temperament. We now have quite a lot of experience in handling bulls—the statisticians would put it approximately 6,000 bull years—and I am more than ever convinced that the worst enemy of a bull's temper is loneliness. In the wild state the bull is a gregarious creature with a strong herd instinct. The A.I. centre where the bulls live, graze and are housed together comes nearer to this than conditions on many farms and this may explain why our experience has been much less fearful than many forecast.

*Ref.: Edwards., J. Proc Roy. Soc., Series B., No. 852, Vol. 128, Feb. 1940, Unilateral Castration and Spermatogenesis.

Summary

The author mentions the changes which have occurred in the United Kingdom milk market and the ways in which production trends are related to it. An examination is made of the part which breeding is likely to play in the light of modern genetic theory and through the medium of artificial insemination. It is seen that there is less certainty in the matter than many (scientists and breeders) would like to believe.

However, the use of well-bred bulls (by A.I.) in all manner and kinds of herds has focused much more attention on the possibility of increased production by better management, A.I. being the breeding "equaliser." The scope for improvement is demonstrated in this sphere by United Kingdom records and production survey studies on Danish and Dutch records.

As to animal health, the author confines his survey to new facts coming out of the A.I. records now being kept for nearly 150,000 herds and 1,250,000 cows. At the same time he draws attention to the possibility of using the A.I. inseminator service to elicit other kinds of information as a form of operational field research.

THE OPENER'S SPEECH

Mr. John R. Currie, B.SC., M.S., N.D.A., N.D.D. (Dartington Hall) said he was very pleased indeed, as a humble economist, to have the opportunity to be a party to the meeting and particularly to open the discussion on this paper. First of all, he wanted to thank the author for his paper, and to congratulate the executive of the B.V.A. for their wisdom in choosing such a timely subject and such an able person to deal with it. He then said:

Dr. Edwards is a born research man; in the first instance he showed great wisdom in choosing to work under Dr. Hammond at Cambridge. Dr. Hammond is recognised, as you all know, as probably the greatest figure in the "animal-husbandry" world to-day, and along with Dr. Walton, another pioneer research man, they made a great team at Cambridge.

It was my privilege to be associated with some of their early pioneer work in A.I., and, therefore, I know something of the difficulties with which they had to contend. Under the stimulating influence of Dr. Hammond they were undaunted, where less courageous researchers might have given up hope of ever seeing their work in the "lab" develop as it has now into a great agricultural technique amounting to a revolution in dairy husbandry. I, therefore, would like to pay a special tribute to the work of Dr. Hammond especially

now that he is retiring from Cambridge, and to the work of Dr. Walton, a real "backroom boy" who seldom allows the public to know of the importance of the work he has done, and is still doing. The Production Unit of the M.M.B., built up by Dr. Edwards, will no doubt be a lasting and fitting testimony to his pioneering outlook, initiative and skill.

In the preparation of his paper Dr. Edwards has shown his usual thoroughness and grasp of detail and, therefore, has not left many gaps in the story which would be easy to fill in and with which to open the discussion. The paper is crowded with solid facts, and with a delightful matrix of common sense, which is the hall-mark of the master mind. However, it is such an important subject that it can bear a little of the dotting of i's and stroking of t's.

The figures Dr. Edwards gives tell their own tale. They show the recent phenomenal rise in milk production, followed by the equally phenomenal rise in milk consumption. Unfortunately, however, there are indications that production is going to exceed consumption. What does that mean? It certainly means that the price problem, as far as the farmer is concerned, is going to be an extremely difficult one to resolve. It would be foolish to conclude that the consumer will agree to present prices with the complacency that has been shown over the last 14 years of shortages and restrictions, if there are going to be large milk surpluses going to the manufacturer. Indeed it might spell disaster to the producers if competitive prices favour substitute products over a prolonged period. Looking at it from the farmer's point of view, it can be seen that there are three ways in which a farmer can make profits. One is by having prices such that they just made it possible for the marginal producer to break even. On the other hand, farmers can seek the lowest cost combination which normally will ensure a margin of profit. The other and best way, of course, is to obtain the highest profit combination; that is, where costs of the original product are just covered by the price of that unit. The last two are the most difficult to pursue in practice and require the greatest knowledge of the factors involved, but, unfortunately for the farmer, are the only ones over which he has any control—I will deal with this point later.

Continuing on the more immediate points raised on Dr. Edwards's paper, I think the most striking evidence of a dynamic phenomenon is the evident flexibility of the British farmer, particularly in his attitude towards efficiency and profitability. For example, the change taking place in breeds alone is a testimony of this. It is no small credit to the British farmer that he is willing to make this change because he naturally nurses many prejudices, and of these perhaps breed preference takes first place.

It is also interesting, and I think marks a definite trend in breed policy, that almost 50 per cent. of the inseminations carried out artificially last year by the M.M.B. were of *one* breed; and that strictly dairy breeds covered 85 per cent. of the total. Milk is undoubtedly the goal of production of most English farmers to-day. Connected with this, is the striking fact worth noting, that nearly 25 per cent. of the increase in milk production, as stated by Dr. Edwards, is due to a change in breed.

Another point of interest is that farmers are realising that the market for liquid milk is getting into a rather tight corner; hence they are tending now to stress quality, which is a very important aspect of consumer demand. They were not, however, going too fast and too far in attempting to get quality at the expense of quantity. They obviously realise that there is a limited market for quality at these higher prices, and if too many attempted to get into this market it would be upset.

Breeding

With regard to breeding which is engaging so much attention now, the difference between the effect of the "genes" and of "management" is awfully difficult to determine and to measure. It is something of the hen-egg problem! Have those concerned tried to fathom which blade of the scissors does the cutting? Certainly one must know something of what each blade is doing, but which is the more important? When I look at the chart presented in the paper and see the remarkable increase in milk yields over the 10-year period for 511 herds, I can scarcely believe that Dr. Edwards is right in attributing it *all* to one blade, in this case, "management"! Breeding, I think, has played a part, and possibly not an inconsiderable part. Corroborative evidence of this, I think, can be found in the next table giving the history of an individual herd. In this herd the average yields progressed rather irregularly from 5,623 lb. to 10,526 lb. in the six years. It is rather remarkable, however, that the years of most marked increases followed the years when 11 heifers, or nearly 50 per cent. of the herd, came to their second and third calvings, and these heifers, too, were the first to show a marked improvement in their heifer yields.

On the questions of genetics and statistical method, Dr. Edwards has stated his approach, and his opinion is worthy of close attention and considerable respect as he has delved deeper into this problem than most. Incidentally, he was the first man to damp my enthusiasm over the Mount Hope system, which brought me great hopes as early as 1929 and, as you know, was based on the method of dam-daughter comparison; he pointed out to me some of its weak points and the fallacies, and has created within me a healthy scepticism of all calculated indices ever since. He now comes along with what looks like a much more efficient tool in the form of R.B.V. I am glad of this but I am rather surprised that he has made no mention of the Danish system of "progeny testing." In my opinion, there is no decided conflict between these two systems, and in some way they may be complementary instruments for trying to get an evaluation of the "blades of the scissors," so to speak. I agree with the logic of the basis of R.B.V. because it attempts to eliminate all factors of management and establish "genetic values," but I am not certain that this goal has been reached. There is not time to deal in detail with its strength and weakness, but I should like to say that I doubt if the technique is sufficiently sensitive to give a complete reflection of management factors—that is, to eliminate their effect, and thus enable us to measure genetical values. It is also doubtful if our present knowledge of measuring details is such as to enable them to be stated in statistical terms: I, at any rate, just don't know how it can be done!

Of course, there is no doubt about it we must get down to the "grass-roots" of the problem if satisfactory progress is to be made in bull selection. As the old proverb says, "the proof of the pudding is in the eating," so the real test of superior "genes" is the expression of superior merit of the daughters, when the effect of environmental factors have been eliminated. The older methods of trying to assess merit by ancestral performance, although providing useful pointers, hold too many deficiencies to be a reliable guide.

Dr. Edwards and I have two different viewpoints, Dr. Edwards looks down with his eagle eye from the "ivory towers" of Thames Ditton, while I, as an agricultural economist, take a worm's-eye view from the "grass-roots." Strange to say, Dr. Edwards has more faith in figures than I have. I always remind myself of the old adage that figures can lie and liars can figure. This is not quoted in its literal sense! Dr. Edwards, too, is well aware of this and also of the more practical aspects, especially of the many variables even within one herd. Until the technique has had further refinement, it is doubtful if one could take the data available at present at its face value, when seeking to trace the more direct relationships. An example of my doubts and dilemma can be cited. The two bulls that were progeny-tested at Dartington Hall during this last season have given different indications under controlled management as compared with the "field." The daughters of one bull, the one showing the highest rating under R.B.V., have given on the average 100 gallons more under "test" than their contemporaries in the "field"; whereas the other bull's daughters gave 177 gallons more. These results are rather puzzling, and all I can say is that until the evidence is clearer, I still think that "genes" have played a more important part in improved milk yields than is at present generally thought to be the case.

Animal Health

Regarding animal health, I want to pay a tribute to the veterinary profession for what has been done in two very important fields: two, I may say, which bothered me very badly in my early days as an economist. These are tuberculosis and contagious abortion. Great things have also been done with regard to mastitis, but a great deal more has to be done before I can feel satisfied that it has ceased to be

a dairy farmer's major problem. From studies of dairy-farming efficiency, I find that mastitis is still a tremendous nigger in the woodpile. In addition to its more immediate effect, on economics, it greatly obscures the genetic factor.

One further point of great relevance to the veterinary profession is the conception rate as shown by A.I. Analysis of A.I. records has shown that there is a persistent proportion of herds where "calving" policy has been seriously disturbed each year. In most cases it is of a temporary nature. This, I think, has led to greater complacency than its economic effect dictates. In a survey, made in connection with a larger study at Dartington Hall, it was shown that approximately 5 per cent. of the herds here had "temporary infertility." In addition it is seen that if a herd was an infertile one in one year it had a four times greater chance of being so the following year, compared with a herd that had not been affected. This shows that infertility may not be as ephemeral as one would like to think. It is scarcely necessary for me to describe in economic terms the serious loss it causes in milk receipts, even when the duration is only three to six months.

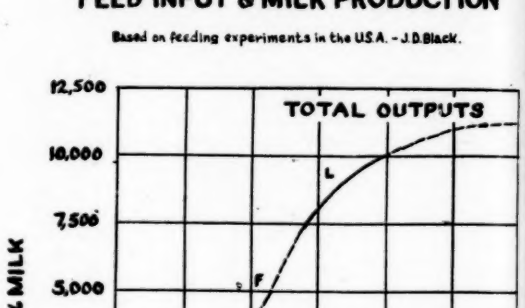
Herd differences in conception rates are extremely variable but they are also extremely puzzling. We at Dartington have tried to do something to relate the figures, and pinpoint the problem. In our first attempt we thought it might arise from natural factors in the area, and it is rather striking, if somewhat puzzling, that the lowest conception rates are to be found in the parts of the area of the lowest rainfall. Dr. Edwards's figures, too, I think, may possibly be more than a coincidence as they are very much in agreement with this. Looking at a map of the area, it is seen that the districts lying to the east of a line from Scarborough to Dorset have the lowest conception rates, and this is also the area of the lowest rainfall. Most striking of all is the fact that the further east, the drier it is, and the lower is the conception rate in all the areas quoted by Dr. Edwards! It is not being suggested that I think the relationship is directly related to, or between, rainfall and some biological factor, but it looks as if there is some management factor or similar relationship arising out of rainfall. It might even be to do with grass or some trace elements or, on the other hand, it might in general be a farm organisational factor. These are points thrown out for consideration which Dr. Edwards might care to look into further.

The Farmers' Problem

Before concluding my remarks as an economist, there are two charts to which I should like to draw your attention, because they not only illustrate how the farmer sees his problem, but they indicate something of the way that the veterinary profession could give further help. An economist could scarcely feel happy unless he was wrestling with the problems which arise from the law of diminishing returns! Be that as it may, neither veterinary surgeons nor farmers any more than economists can get away from it! It is what every farmer has to deal and struggle with all the time. Every day he rises he has in some shape or form to resolve the problem it presents. In a simplified and more understandable form it could be stated as the "law of increasing resistance."

As I already mentioned, farmers are going to have a difficult time of adjustment to meet a free market and increasing overseas competition despite the buffer of subsidies provided for the purpose, and to meet the implications of the 1947 Agricultural Act. They will have to plan their farming organisations and use such techniques of production as will maximise their chances of making reasonable profits. This means that they will require a great deal *more data*, particularly of a physical nature in the first instance, as a basis for making their decisions. Some of the more important factors for this purpose lie within the province of veterinary science. This is particularly the case with relation to animal nutrition, parasitology and regularity of breeding. At present, the lack of knowledge of some of these problems is holding back efficient production or, as I prefer to call it, *lower-cost production*, on many farms.

As most of you will agree, particularly those who come in direct contact with farmers' problems, farming is a line of business activity in which for obvious reasons, the "law of diminishing returns" is more evident and clearly apparent than in most economic activities—in other words, there is obvious and greatly increasing resistance to economical output as production is pushed up and intensity of production sought for higher profitability. In fact a farmer's whole business life from day to day and season to season is a stiff struggle with resisting forces.



The graphic illustration of the nutritional problem in getting higher yields, shows the economic process and trends. The top part of the graph is divided into three parts: Point M shows the quantity of Digestible Nutrients TDN necessary to maintain the cow. From M to L, milk is produced as a response to increased food supplied and above L the additional output of milk is less and the cows put on weight or waste the nutrients. In practice, of course, milk production does not begin sharply at point M, the cow would produce some milk below this level but it would lose weight. The dotted line EF shows milk production under weight-losing conditions.

This problem of the increasing resistance of his environment faces the farmer in all aspects of his work. Nutrition is only one of the factors, but it may be brought home to him by a case of acetonaemia or, through over-stocking his pastures, the parasites may build up in the sward and bring about a lowering of the milk yield, or reduce beef or mutton from each unit of feed consumed. Or, it may be that he cannot get his high yielders in calf. Again, he may have improved his pastures and be brought up against the limit very sharply by bloat. In all these cases he is finding that the law of increasing resistance limits expansion, and consequently his financial return, and it is here that the veterinary surgeon can do an immense amount of good both by warning the farmer of the dangers ahead and by showing him how to avoid them.

It is scarcely necessary for me to stress the moral or to illustrate further the great need the farmer now has of every bit of scientific knowledge the veterinary profession can provide for his guidance. I feel confident that in the near future the profession will meet the challenge in full.

THE DISCUSSION

Mr. S. L. Hignett, B.SC. (Lond.) (Frant) said that he wanted to congratulate the essayist on a most important and extremely interesting paper. However, whilst he had an appreciation of Dr. Edwards's kindness and charm on the one hand, and an admiration for his ability, which was second to none, they did not always see eye to eye—but that was a healthy state of affairs.

With regard to the expectations of the widespread use of artificial insemination, they all started off as idealists. They were fully aware of what could be achieved by an intelligent policy of grading-up, but a number of them were extremely disappointed, not because of what was achieved but because of the general attitude of the majority of people using artificial insemination at the present time. It was abundantly clear that most of those people were far more interested in conception rates than the quality of the progeny, and that, of course, was not a desirable state of affairs.

With regard to the graphs which appeared on pages 7 and 8 of the paper, Mr. Hignett had thought they were there to show how they were narrowing the gap in milk yield between recorded herds in this country and recorded herds elsewhere, but it was now obvious that they were there to indicate what had to be done, not what had been done.

He was extremely interested in several points which were made by Dr. Edwards and by the opener chiefly because they were points that were made at the Congress at Cardiff in 1950 and again at Eastbourne in 1951. At Cardiff great stress was placed upon the relationship between rainfall and conception rates, and at Eastbourne it was stated that by improving the management and feeding of the national herd they could achieve more in 12 months than would be achieved by a progressive grading-up policy in 20 years. It now appeared that their friends from Thames Ditton were in complete agreement with that statement.

Mr. Hignett was delighted to see that emphasis was placed on the personal factor when it came to obtaining high milk yields. This had really pleased him because from time to time he got the impression that their friends from Thames Ditton were punch drunk from the constant impact of the calculating machine. It was good to see the human touch could still come into observations which they made.

As for the fertility of the national herd, all of them who worked in the field came across herds which during a long period of time had a conception rate of 100 per cent. or very nearly 100 per cent. That being the case, if they aimed at a conception rate of 66 per cent. at first service then they were setting their sights much too low. They must go for the ideal and not be satisfied with the present state of affairs. When they talked about conception rates of 66 per cent. it should be appreciated that they were based on presumed pregnancies, and the difference between those and the actual calving rate was likely to be from 5 to 10 per cent.

Turning to Dr. Edwards's reference to infertility, it would be interesting to know the basis on which the incidence of herd infertility was assessed. By a process of analysing records from A.I. centres and from field observations and using a yardstick, details of which had already been published, Mr. Hignett was satisfied that a herd breeding problem existed in 10 per cent. of the dairy herds in this country at any one time. It was agreed that the vast majority of those herd breeding problems were of a temporary nature. On the other hand, Dr. Edwards seemed to exaggerate the temporary nature of a number of those problems. There was a great deal yet to learn, but by way of explanation of some of the temporary infertilities one might mention the phenomenon of cows and heifers acquiring a tolerance to a bull-borne infection. Detailed investigations at Frant had shown that in some herds, if feeding was followed carefully, there could be demonstrated a drop, temporary and quite unexpected, in essential constituents of the ration and that drop could go below the critical level for normal fertility, and then again, equally unexpectedly, the level rose above the minimum requirement.

It was, of course, extremely interesting to hear of the records that Dr. Edwards kept of the supposed causes of the herd breeding problem. Mr. Hignett said he must apologise because he must have contributed not a little to the length of the list. Many of the entries for which he was responsible were mistakes, but it should be remembered that those who never made a mistake never did anything. What did Dr. Edwards do about the list? Did he ignore it or tick off what was subsequently substantiated? For example, did Dr. Edwards accept that *Vibrio foetus* infection was a common cause of the herd breeding problem?

In Table X Dr. Edwards showed the relationship between the calving service interval and the conception rate which could be expected. It was said, of course, quite rightly, that when farmers were trying to catch up on the herd breeding programme they would resort to service soon after calving. It should be emphasised that if there was a genital infection in the herd that was a most undesirable practice because, when genital infection existed, unsuccessful service was far worse than no service at all.

In conclusion, Mr. Hignett wanted again to pay a tribute to Dr. Edwards, not only for his paper and introductory remarks, but for all he had done for the dairy industry in this country.

Dr. Edwards thanked Mr. Hignett very much and said how much in the early days he enjoyed working closely with him. Some of them had been disappointed to find this great emphasis on conception rates when it was thought that the great advantage of A.I. would be the genetic advantage. He was not sure stock were being better reared now than when A.I. was started, and there was room for improvement. Steps were being taken in that direction, and he wished he had been able to show a film of a show his Chief Veterinary Office ran alongside his centre at Beccles last April. About 80 per cent. of the cattle were non-pedigree and in one class of 27 heifers the judge said six were good enough to go to the Royal. It was probable that the conception rate problem would die down and they would hear less about it. In the beginning it was easy for people to blame the A.I. centre if they got bad results. The moment an A.I. centre produced a bad result there was howl from the member, but such things sorted themselves out.

As regards yields, Mr. Hignett realised how very important was the personal factor. Dr. Edwards thought this was linked up with the difference between Mr. Currie and himself with regard to testing bulls. Mr. Currie thought that he (Dr. Edwards) was in an ivory tower and that he himself was at the grass roots, but Dr. Edwards thought it was the other way round. It was known that daughters from one bull might be temperamental, but the standard management provided the "grass root" way of testing bulls for temperament and other qualities.

Recently Dr. Edwards had spoken to a Dane who said that two of their tested bulls had done extraordinarily well at the station but they behaved very differently under farm conditions. One bull had done just as well under farm conditions, but the other had not done nearly so well. The difference was thought to be caused by the bull's daughters in the second case being very highly strung and when they got knocked about on the farms, they did not do so well.

Mr. Hignett had asked what was done with the list of theories of causes of infertility which Dr. Edwards kept on his desk. At the moment the most Dr. Edwards said he did with it was to keep adding to it. Various theories came along and one would like to see them substantiated, but it was difficult. He wished the Board's veterinary staff and the veterinary practitioners could, by some diagnostic means, get together to tackle the problem of infertility when it was developing, but they were always three or six months behind. If there was some way of diagnosing on a farm the onset of this infertility the problem could be studied in a much better way. It was a question of how to get on to the problem before any time was wasted.

Dr. Edwards said he was not going to be drawn in on the question of *vibrio*. He had no research background in this field on which to base a conviction. Among his veterinary staff there were different points of view. Fundamental research was being paid for at Bristol, but he would not like in public to say too much about that or too much about his personal views at the present time.

Dr. W. R. Wooldridge, PH.D., M.SC., F.R.I.C. (London) said that Mr. Currie had referred to the fallacy that figures could lie. It was not figures that lied, but the deductions made from them by human beings.

Dr. Edwards had done a great service by placing before them quite clearly a large mass of figures, without making firm deductions. The paper would have been nothing like so valuable if firm deductions had been made from facts which were not yet based on sufficiently wide evidence. Despite that, however he would implore Dr. Edwards to try to extend his factual survey.

One of the greatest things needed by the profession, and therefore needed by the agricultural community, was facts concerning the presence of disease and facts concerning the real efficiency and efficacy of the veterinary profession on the farm. It seemed that some simple scheme for obtaining some of those facts could be evolved and worked by the Milk Marketing Board and by no other organisation in the country. The Board might, for instance, start by asking dairy farmers, "Do you consult a veterinary surgeon?" They might go further and ask, "When do you start consulting your veterinary surgeon, when disease appears or before disease appears?"

Somewhat later on there would be, it was hoped, a number of farmers whose records could be relied upon, and through those farmers it might be possible to get greater contact with the practitioners who were attending them to find out what diseases were actually occurring and when they in fact occurred. With knowledge like this about the presence of disease on particular farms it might be possible to see what effect disease was in fact having upon milk production. There would then be some general facts which would assist research workers to get down to the more particular detail. Could some development of that kind be evolved through the mechanism of the Milk Marketing Board?

Dr. Edwards was one of those who wished to co-operate with the veterinary profession. By inviting the eminent members on the platform to be present, the profession had shown that it was anxious to co-operate fully with them.

THE REPLY

Dr. Edwards thanked Dr. Wooldridge for a most important contribution. Speaking personally he could say he loved facts and remembered Huxley's dictum, "God give me the strength to face a fact even if it slay me." There was an incredible array of information in front of them if only they went out to get it. The Milk Marketing Board was keen on getting facts and on having the co-operation of the veterinary profession, not only in getting them but in helping to interpret them.

The paper mentioned a survey which the centres compiled with Professor Blakemore. Dr. Edwards had thought that was a pioneer venture, but since writing the paper had remembered that Dr. Lovell at the London College did something similar and pioneered that method in 1936. The Board's fact finding mechanism was very much greater now with the enormous number of records kept. Professor Blakemore would, in due course, be publishing results of the first fact finding survey. At the moment simple answers on summer mastitis were being collected. About a month earlier mastitis was being referred to everywhere and it seemed to be more prevalent this year than in the past. A little fact finding on it was carried out in one week and the results would be known shortly. When an estimate was made of the number of farm visits to be entailed it was realised to be about 9,000 in one week. The Board and its veterinary staff would welcome any suggestion to support this kind of fact finding survey to help the profession and the farmers.

The Chairman said that it only remained for him to thank Dr. Edwards for his work in putting the paper together and for the able way in which he had produced it. Perhaps no one had expected to be able to face him with questions because he had such a nimble mind. But he had certainly shown them in an impressive way how quietly and thoroughly the Milk Marketing Board was building up a service which in the long run would operate to the benefit of the farming industry and those who lived by it.

Mr. Currie also deserved their thanks for the opening of the discussion on such a wide range which touched on most of the points which were still controversial in this field of animal husbandry. (Applause.)

Dr. Edwards added that he was very grateful for being invited to the Congress, not only because he was able to see so many old friends and discuss this problem but because it entailed writing the paper. One could get very close to things without knowing where they were leading to, and in writing a paper one was really made to sit down and ask "Where are you going in some of these very important matters?" In the three fields of breeding, management and animal health he had tried to see where they were going. The paper did not provide all the answers but its preparation had made him think.

In conclusion he wanted to repeat his conviction that the Board and its veterinary staff were absolutely wholehearted with the veterinary profession in anything that could be done to help to solve some of the animal health problems on the farm.

Captain G. Atkinson (Exeter) said that on behalf of the meeting he wished to thank Mr. Sutcliffe for giving up his time to occupy the chair. It was unusual for them to have a non-veterinarian in the chair, and it would be agreed that Mr. Sutcliffe had conducted the proceedings in a most able manner. (Applause.)

The Chairman, in acknowledgment, thanked the meeting and said that he had attended one of the Congress gatherings earlier in the week and was surprised to find he recognised more faces there than he would at a gathering of farmers. (Applause.)

THE UNIVERSITY OF LIVERPOOL

Examination List, December, 1954

M.V.Sc.—Ford, E. J. H.

B.V Sc. Final Examination

Part I—Arnall, L.; Brown, J. K.; Edwards, Patricia; Haworth, E.; Jaggar, J. H.; Kneen, J. E.; Rees, J. B.; Sanders, G.

Part II—Arnall, L.; Brown, J. K.; Edwards, Patricia; Farrer, J. S.; Haworth, E.; Jaggar, J. H.; Kneen, J. E.; Rees, J. B.; Rothwell, J.; Sanders, G.

MEDICAL EDUCATION

In an editorial discussing the proceedings of the World Conference on Medical Education held in London in 1953, *The Practitioner*, November, 1954, makes the following comment.

"So far as we in Great Britain are concerned one lesson is clear from a perusal of these pages. For the maintenance of that high standard of clinical practice which has always been the hall mark of British Medicine the length of the medical curriculum must be cut to five years, followed by one year's compulsory service in hospital. Only by so reducing the course can all the frills be discarded which the non-clinicians and administrators have added to the curriculum during the last two decades. They are not only not essential, they have become a positive danger to the training of a doctor who is both a cultured humanist and a sound and understanding clinician."

FOURTEENTH CONGRESS PAPER

Inherited Defects of Dogs

BY
GILBERT B. YOUNG
Animal Breeding Research Organisation, Edinburgh.

This, the last paper of the Torquay Congress, was discussed on September 24th. Mr. S. F. J. Hodgman was in the chair, and the recording secretary was Mr. D. R. Etoe.

THE Chairman said that this was a subject which had been sadly neglected as far as the dog was concerned, but, fortunately, Dr. Young had been working on it in Edinburgh and was now going to say a few words on his paper. Miss Joshua was also interested not only from the veterinary point of view but from the breeding angle too, and she would open the discussion.

Dr. G. B. Young, introducing his paper, said that unlike the other speakers at the Congress he was not working with the species he was discussing, but as he was addressing an audience many of whom had been handling dogs daily and were acquainted with the background of their disorders he felt sure his deficiencies in canine experience and pathology would be made good.

He continued: I look upon my paper as serving as an introduction to a discussion in which others can give their own experience of hereditary diseases, but a brief mention of the general approach to the types of condition discussed in the review may not be out of place. These fall into two main groups, those due to major genes and those where multiple factors are present.

Only a few defects due to major genes have been investigated and it is likely that many more will be studied more deeply in the future; they provide material for the study of gene action. Such study practically will lead to early diagnosis of defective animals and to the detection of carriers.

An example of such a condition worthy of further work is cryptorchidism. This condition is widespread and is of economic significance. Its investigation might throw light on the problems of testicular descent. The data obtained so far has not been inconsistent with the hypothesis of a single recessive gene being responsible, and of this possibly having some effect on female embryos. What are now required are mating tests to test this hypothesis and to study the variation in the manifestation of the condition. With the passage of time it is likely that some organisation will interest itself in this condition and carry out these tests. By such a process we may look forward to a building up of information on canine genetics which will be useful to geneticists, practitioners and breeders.

Possibly of greater interest, however, are those conditions under the control of multiple factors, and often influenced by environmental factors. These include questions of fertility, mortality, disease resistance and so on. These problems are tied up with fundamental questions such as general vigour and resistance to specific diseases, the genetic correlations between size, growth, fertility and disease resistance, and the effects of genotype-environment interactions.

Little has been done on these problems in dogs, and even in livestock they are only beginning to be investigated experimentally. The sections of this review dealing with them are smaller than those devoted to genetic defects and we can only hope when other such reviews are written in the future the balance can be redressed. We shall then be able to talk about constitution and know what we mean, and we shall be beginning really to understand the biology of disease.

THE PAPER

Dr. Young's paper, which had been previously circulated, was as follows:—

GENETIC defects constitute a small but interesting part of canine veterinary practice. While so little critical work has been done that it is difficult to generalise, they probably follow the same rules as in other species. They may be inherited as dominants or recessives subject to varying degrees of environmental or genetic modification. Some may be produced by very complicated genetic and environmental interactions. Environmental effects may simulate genetic ones, and similar clinical conditions may have different genetic causes. They may affect the animal at any stage of life, almost from conception to old age.

Superior prognathism

This is one of the commonest defects of dogs. The condition has been investigated by Grüneberg and Lea (1940) in long-haired Dachshunds. The primary gene effect seems to be a shortening of the anterior mandibular parts possibly due to a reduction in size of the teeth. The resultant faulty occlusion apparently leads to a lengthening of the upper jaw.

Grüneberg and Lea concluded that a simple recessive is responsible. Since affected animals, though fully vigorous, are valueless for showing

and are rarely used for breeding, most affected animals have normal parents.

Most British long-haired Dachshunds are derived from a small group of closely related animals imported from Germany after the Great War. Pedigree analysis showed that at least one, and probably several, of these must have been heterozygous.

Haemophilia

This is an interesting, and possibly widespread, although infrequent, defect. Hutt *et al.* (1948) reported an outbreak in a prize-winning kennel in America. Affected puppies showed between six and 13 weeks of age lameness and swelling of joints and subcutaneous tissues. Some bled to death from slight injuries and others became partially paralysed. All observed cases died within seven months of birth. Recent work indicates the similarity of the clotting defect in dogs and humans (Graham *et al.* 1949) and also the possibility of rearing males with blood transfusions, followed by the production of haemophiliac females out of carrier bitches (Brinkhous and Graham 1950).

Haemophilia is inherited as a sex-linked recessive. Half of the male pups by a normal dog from a carrier female will be affected, and none of the females.

Haemophilia has also been reported in Britain in Aberdeen Terriers, in the Dutch East Indies in Greyhounds, and possibly in Scotch Terriers in Denmark.

Progressive retinal atrophy

This has been thoroughly investigated by the Animal Health Trust (Hodgman *et al.* 1949). Defective vision appears first at night and later in daylight, and is due to an atrophy of the retinal receptor cells associated with a reduction of the retinal blood vessels. The cause is almost certainly an autosomal recessive.

The disease was first noticed in Sweden in Gordon Setters which were all closely related to an unaffected but heterozygous imported British dog. In Britain it became prevalent in the 1920's in Irish Setters following extensive line breeding in another famous carrier dog. The disease also occurs in the U.S.A., Australia, France, Holland and Eire, in the descendants of dogs imported from the U.K.

Haemolytic disease in new born dogs

The disease has been studied experimentally in great detail (Young *et al.* 1951). It has also been reported as a result of natural immunisation during pregnancy. It appears regularly in pups born to bitches immunised by transfusion of dog erythrocytes of type A and mated with sires, having red cells containing the A factors.

Iso antibodies are not present in the serum of newly-born dogs, but are acquired from the mother's milk during the first day of life. Severely affected pups nurse poorly and become very pale within 24 to 48 hours. Of 24 affected pups, nine died within three days.

Young *et al.* report that they have not yet demonstrated transplacental immunisation, but state that one report indicates it may occur. They therefore hope that breeders and veterinarians will look o for this, especially in bitches with multiple pre nancies.

Reference may be made to the inheritance of t canine blood groups. Five antigenic factors defin by antibodies have been studied. These factors a named A, B, C, D and E, and Cohen and Full (1953) have shown that these factors appear to b inherited as simple dominants.

Cryptorchidism

The failure of testicles to descend may be un lateral or bi-lateral, inguinal or abdominal. U lateral cases are generally fertile. Cryptorchids a usually considered to be of uncertain dispositi and the retained testicle prone to develop tumour

Hartl (1938) studied in one breeding establis ment practising line breeding of German Boxers, affected and 28 normal litters (by 20 males out 26 females). By the age at which cryptorchidis could be diagnosed, 23 per cent. of 168 males rear were affected.

In a study of a total of 55 affected litters (inclu ing the above) 36 per cent. of 183 males raised we affected.

The condition is not due to a dominant, sin very few of the affected pups had cryptorchid sire It is possibly due to a recessive, the excessive num ber of affected animals from the 55 litters being d to matings involving homozygous females—or t exclusion of litters due to carrier matings where a defect has appeared.

Hartl's data for the first 28 affected litters show 109 males and 70 females at birth. ($P < 1$ per cent This sex ratio, if n t due to errors in recording, su gests that the gene may not be entirely harmless in th female. The existence of different degrees of th conditions would suggest that environmental genetic modification plays a rôle.

Hartl shows that nearly all German Boxers trac back to a dog which was probably a carrier. Exte sive line breeding to him occurred in the 1890's.

Uric Acid Excretion in Dalmatians

Most dogs excrete appreciable amounts of allan toin and small amounts of uric acid, but Dalmatian excrete relatively more of the latter substance. Thi abnormality has been extensively studied. Friedma and Byers (1948) found the condition was not du to accelerated purine metabolism or failure of th liver to convert uric acid to allantoin. Unlike an other known animal, the Dalmatian excretes ur acid at the exact level of glomerular filtration, an there is no subsequent reabsorbtion from the filtrat This kidney anomaly is inherited in a dominan fashion.

Merle Coat Colouring

Dominant spotting, which in the homozygous con dition produces defects, occurs in Dachshund (dappled), in Collies and Shetland Sheepdog (merled), and also in Dunkerhunds and Foxhound (Sorsby & Davey, 1954). The heterozygotes fre quently have wall eyes, and the tapetum is lackin

or rudimentary. The homozygote shows gross ocular anomalies, marked depigmentation of the coat, and frequently deafness.

Harlequin Great Danes show similar effects in the heterozygotes and homozygotes.

Posterior Paralysis in Great Danes and St. Bernards

These breeds often have individuals with more or less pronounced weakness in the hind limbs. Stockard (1936) in breed crosses found only four out of 57 pups which did not exhibit marked paralysis at 11 to 14 weeks due to death of neurons in the horns of the lumber regions of the spinal cord. The conditions suggested that dominant genes modified and made comparatively harmless in the breed contributing them might be responsible.

Defects Incorporated in Breeds

Many breeds made a virtue of traits that in other species would be considered defects.

Stockard (1949) considered that St. Bernards and Newfoundlands exhibit acromegaly. They are giant breeds with heavy skins, faces and lower jaws and enlarged feet. The Bloodhound is similar except for its normal size.

Pekes and French Bulldogs are achondroplastic dwarfs. They have normal heads and trunks but very short legs and flattened faces.

Some breeds exhibit localised deformities. In the Dachshund and Basset Hound the head and body are normai, but the limbs show exaggerated achondroplasia. In the King Charles Spaniel, the Boston Terrier and Brussels Griffon the legs are normal, but they have achondroplastic heads.

In contrast to these acromegalic and achondroplastic breeds, Toy Poms and Pinchers may be considered as aetiolitic dwarfs; Wolf Hounds and Great Danes as giants of normal proportions.

Stockard considered that a semi-dominant modified gene is probably responsible for the limb achondroplasia in all affected breeds. The genetics of short achondroplastic head was, however, complex. Different factors affected different parts of the head, and these were sometimes inherited as dominants and sometimes as recessives. The result depended on the breeds crossed and great variability was found especially in Bulldog crosses.

The length of the lower and upper jaws was inherited independently and in his crosses many instances of overshot and undershot jaws occurred.

Other defects incorporated in breeds include kinky tail in Bulldogs and French Bulldogs; virtual absence of the tail in Old English Sheepdogs, Schipperkes and Doberman Pinchers; and hairlessness.

Other Defects

Many other hereditary defects have been described (for references see Burns, 1952; Winge, 1950; Whitney, 1948).

Hereditary deafness, possibly associated with white colour, occurs in Bull Terriers, Sealyhams and Dalmatians. In Bull Terriers, the condition seems to have spread following line breeding to one particular dog, but seems to have been reduced following breed society efforts. Genetic deafness has also been reported in Scotch Terriers, Border Collies and Fox Terriers.

The complicated eye structure is susceptible to many genetic defects, and among those described are glaucoma, especially in Fox Terriers; wall eyes; some cataracts in Alsatians and Pointers; coloboma; trichiasis and distichiasis, especially in Bulldogs and Toy Spaniels; and entropion, especially in Chows and Pekes.

Of bone defects, Perthe's disease is especially common in Fox Terriers and a similar condition had been reported in Alsatians. Dew claws seem to be inherited in some cases as dominants, although with modification. Cleft palate is probably irregular in inheritance. Papers have been published on overshot jaws in Bulldogs, Cocker Spaniels and Collies. Little is known about the inheritance of the undershot condition. Of nervous defects, fits in Bull Terriers, cramp in Scotch Terriers, and a permanent trembling of the hind quarters of Airedales suggest inheritance.

Albinism occasionally occurs and is probably recessive. A hereditary dorsal invagination of the skin has been reported in Rhodesian dogs.

Umbilical hernia is probably hereditary in Cocker Spaniels, Collies and Bull Terriers.

Some forms of rickets, goitre and eczema may also have a hereditary basis.

Disease Resistance and Fertility

Little unfortunately is known about genetic influences controlling these in dogs.

It seems probable, as in mice, that different kinds of dogs will differ in susceptibility to infectious diseases, and a suggestion has been obtained to that effect, Bloodhounds apparently being especially susceptible to distemper. (Whitney, 1948.)

Work from other species of livestock suggests that inheritance is not likely to be a major cause of sterility, although there are marked differences in prolifigacy between breeds.

Little's (1948) work suggests that the ratio of males to females is greater in first litters, in the offspring of black compared to red coloured mothers, and in the proportion of pups born dead or non viable. He found, however, no seasonal differences.

Neoplasms

Mulligan (1949) in a survey of 1,000 neoplasms collected from 809 dogs, concluded from an analysis of five breeds, that the tendency of each breed to have neoplasms was about equal. A comparison of the types of tumours showed definite differences.

The Fox Terrier exhibited a high incidence of neoplasms of mammary, sebaceous, perianal, and nerve sheath cells and a definite tendency towards mast cell, fibro-blastic and testicular tumours.

The Cocker Spaniel was especially disposed to tumours of mammary perianal and sebaceous glands. Histiolglioma had a specially high incidence, and neoplasms of fat cells were fairly common.

The Boston Terrier had a strikingly high incidence of mast cell sarcoma, showed a predisposition to mammary and fibro-blastic tumours as well as some tendency to melanoma and nervous tissue tumours.

The Scotch Terrier was particularly prone to melanoma, lymphosarcoma, squamous cell papilloma and carcinoma. Neoplasms of fat cells and fibro-epithelioma (fibro-papilloma) were also fairly prevalent.

The German Shepherd Dog was inclined to neoplasms of sebaceous gland, and fat cells. Fibro-epithelioma, neoplasms of smooth muscles, of endothelial cells and of testes were noted with some frequency.

Control of Defects

Genes causing major defects are probably not rare in any breed, and possibly most individual dogs, if their progeny were inbred, would be found to be carrying at least one. The common practice of outbreeding, however, keeps the appearance of defects at a low level. Little (1948), for example, found that only 1.7 per cent. of pups possessed defects like cleft palate and hare lip. When, however, following line breeding, their frequency rises, they become a source of economic loss to the breeder. In the present review only about three dozen defects are mentioned. In humans, over 200 are known, and it seems likely that many remain to be described in dogs. In particular, abnormalities of skin and nervous system seem to be missing.

Any rational means of control depends on accurate genetic diagnosis. Pedigrees are frequently used, but are often unsatisfactory owing to too few animals, inadequacy of the clinical diagnosis and errors in the pedigrees themselves. Ratios of affected to normals from several affected litters are generally more useful but necessitate a correction to allow for normal litters from carrier parents. Mating tests involving repeat matings are probably the most satisfactory method of diagnosis, but are expensive and generally require the production of 5 to 10 litters to detect recessives. When the method of inheritance is complicated the matings required to produce an adequate analysis would be beyond the resources of most concerns. The most common difficulty, however, is to distinguish a recessive from a dominant with incomplete penetrance when only a few animals are involved.

Mutant genes causing infertility or death tend to eliminate themselves, dominants relatively rapidly, recessives very much more slowly. Mutation, however, counter balances this effect. Mutations are commonly estimated to occur only once in 10^5 times at any one locus. Grüneberg (1947) observes that while the mutation rate will result in any ejaculate containing the majority of mutations, many several times over, because of the great number of spermatozoa, few of these new mutations will be passed on.

In livestock practice, the spread of defects is associated with breed structure. Recent cattle studies have emphasised that most breeds are dominated by a few leading breeders who exchange stock with each other. From these in pyramidal fashion there is a descent to less important breeders who buy from the top breeders and from them to the great majority of animals in the breed. It is almost certain that a similar structure exists in the dog industry. Where a genetic defect appears in one of the top studs it is likely to be spread as dogs from that stud are sold down the pyramid. Side actions or pleiotropic effects of the gene causing a defect, indeed may in some cases be one of the reasons for the good qualities in the top studs. A defect is most likely to spread within the top stud when the breeders have been line breeding to a favourite animal who is a carrier. It is most likely to appear in one of the lesser studs where the breeder has been buying his dogs persistently from one or two of the top breeders.

In all hereditary conditions the basic method for their reduction is to refrain from breeding from parents, sibs and progeny of defectives. Where the condition is widespread, however, the large number of carriers render this impossible and slower methods must be adopted, efforts being concentrated on ensuring that the most widely used dogs are free from the condition. In a serious condition like night blindness, the use of test matings may be justified. In such a case, only one out of 64 carriers will fail to produce a defective pup if at least six pups are born when he is mated to a homozygous carrier. When the suspected carriers are tested against known heterozygotes, 19 out of 20 would be detected if at least 12 pups were produced.

Combined action involving a Breed Society is probably only justified in severe diseases where the mode of inheritance is known. Action, however, such as was taken in the case of night blindness whereby the members of the Irish Setter Association agreed not to offer for sale without disclosure any affected dog or its offspring unless they passed mating tests, and the Kennel Club refused to register affected dogs or proven carriers, would almost certainly reduce the frequency of the condition. The intense selection necessary, however, in this case has probably necessitated relaxation of selection for other characters.

In conditions such as infertility and disease susceptibility where multiple factors operate, heritabilities are probably low and natural selection occurs, there seems to be little case for positive action.

Summary

The inheritance of such conditions as haemophilia, progressive retinal atrophy, cryptorchidism, etc., is briefly discussed. Reference is made to the genetic aspects of infertility, disease resistance and tumours. In the control of defects, the necessity to concentrate on the leading studs is emphasised.

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THE OPENER'S SPEECH

In opening the discussion, **Miss J. O. Joshua,** F.R.C.V.S., (London), said: As always the opener of the discussion has the pleasure and privilege of being the first to thank the essayist for his efforts. To-day I am particularly pleased to be able to offer my thanks to Dr. Young for a masterly and wide survey of a subject in which I personally am particularly interested and one which has wide implications for the profession and for the very considerable pedigree dog fancy of this country. His excellent survey of the literature and concise discussion of the numerous conditions he has included in his paper have paved the way for my incomparably easier task of opening the general discussion, which I propose to do by considering certain practical aspects of some of the points he raised and their application to our everyday practice and the welfare of many breeds of dog in this country.

Cryptorchidism

This is a condition which has worried me for some years as my impression, and I admit it is only an impression, is that it is more commonly met and in a greater number of breeds than previously. I personally interpret the term cryptorchidism very widely, believing the only normal condition for the dog to be that of having both testicles in the scrotum. Unilateral or bilateral abdominal testes, unilateral or bilateral inguinal testes, unilateral or bilateral short-corededness, I believe them all to be abnormal. Cryptorchidism may not affect stud owners markedly as it is rarely so complete as to cause sterility, and if an older dog develops disease symptoms of hormone unbalance or neoplasia of the ectopic testis the result is not so serious as for the owner of a single, non-show household pet to whom it means both emotional and financial distress. The frequency with which the ectopic testicle undergoes pathological changes has led me to advise the removal of the offending gonad in youth, as soon as I detect the condition.

It is a truism that all dog breeders depend very largely on a flourishing pet market to maintain their establishments and a breed which is subject to any widespread hereditary defect soon loses public favour. It is therefore in the interests of the fancy itself that all reasonable steps should be taken to eliminate such defects. It is in this connection that the attitude of the Kennel Club is so incomprehensible. In reference to cryptorchidism they have issued a directive to judges (all championship and open show judges must be approved by them) that they should ignore cryptorchidism and not penalise it in the show ring as it is a purely veterinary matter!

Despite this, some judges do penalise such defective dogs. Many breeders are themselves concerned about the matter. At a recent championship show for whippets and chows I found approximately 50 per cent. of the former breed males to be unilateral cryptorchids—one breeder told me there were many bilaterally affected dogs, but they did not show them as the defect was visibly obvious! Several breeders expressed concern over the state of affairs, but quite reasonably did not see why they should worry if the Kennel Club did not. In the other breed, chow, no cryptorchid was detected, and I have personal knowledge of the fact that chow breeders will not use a defective stud if they are aware of its condition. This attitude is so pronounced that not so long ago the owner of a well-known dog which had been the subject of a "whispering campaign," had the dog examined by a well-known veterinarian, who issued a most carefully worded certificate stating that this dog had both testicles external and palpable—no mention of the scrotum was made. The chow fancy is presumably satisfied, but I am left with the very definite impression (I have not examined the animal myself) that he is bilaterally short-corded!

Achondroplasia

In the breeds Dr. Young has mentioned in this connection none have achondroplastic trunks, but during the 1930s Professor Wright drew attention to the fact that the Scottish Terrier had undergone achondroplastic changes. In this breed the head is normal but the body and limbs are affected. In my opinion this condition became widespread following the popularity of a well-known stud who was then considered to be the epitome of breed type. In fact he was grossly exaggerated and virtually an achondroplastic monstrosity. The pelvic girdle from a Scottish Terrier bitch which I have here demonstrates the dorso-ventral flattening of the pelvic inlet admirably, particularly when contrasted with that of a dachshund, another breed of achondroplastic legs but normal body. There is no need for me to remind you of the frequency of maternal dystokia in the Scottie, especially during the late '30s and early '40s; at that time dystokia was due to the impossibility of forcing a normal foetal head through an abnormal pelvic inlet; more recently primary uterine inertia accompanied by exceedingly low foetal viability is the Scottie bugbear, probably the result of several generations of fruitless labour by Scottie bitches to deliver and of Scottie whelps to be born. Fortunately for the breed this has to some extent become a lethal factor and thus self-eliminating, and I hope other canine practitioners agree with me that Scottie dystokia is slowly diminishing.

Of the other breed defects which Dr. Young mentions under this heading I would not always agree with his suggested breed distribution Trichiasis and distichiasis I would have said was easily most common in the Pekingese, particularly in certain strains which I will *not* name for obvious reasons, whereas I would have said entropion was not common.

So-called Perthé's disease (coxa plana) I have found commoner in shorter-legged breeds, particularly Cairn Terriers.

Under nervous defects I would include what I believe to be a form of claustrophobia in Bull Terriers.

I regard all non-acquired herniae, *viz.*, umbilical, inguinal and scrotal, as being hereditary and have found it again commonest in the Pekingese; I find the latter types (inguinal and scrotal) common in Pekes, umbilical in Wire Fox Terriers and inguinal fairly common in Cocker Spaniels and Dachshunds.

Dr. Young also mentions some forms of rickets, and it certainly does seem that many Alsatians have abnormal bone development quite unrelated to vitamin and mineral intake.

The glaucoma of the Wire Fox-terrier which the essayist mentions is usually secondary to luxation of the lens, and certainly the Wire Fox-terrier is the breed for this.

A defect which occurs in several breeds, notably Poodles both miniature and standard, but also in Bedlingtons, Sealyhams and Wire Fox-terriers, is abnormally heavy hair growth in the external auditory canal. I consider this to be probably the greatest single cause of external ear disease in the dog and hence the cause of a good deal of suffering to the animal and trouble

and expense to the owner. The Miniature Poodle has enjoyed a period of unprecedented popularity but, judging by the remarks of many of my clients who own them, the boom will soon be over, as many of them say "Never again."

If only breeders would see that to ignore these obviously inherited defects spells disaster for the popularity of their breed, maybe they would set more value on the advice of geneticists and veterinary surgeons on breeding programmes.

Structure of the Fancy

Dr. Young mentions the pyramidal structure of the fancy as a factor in dissemination of hereditary defects.

The pyramidal structure he describes with a breed dominated by one, two or a few kennels concentrating on their own blood lines still exists in some of the less popular breeds but in many breeds, particularly larger ones, this structure was largely demolished by the second world war. Before 1939 many people were able to maintain kennels containing large numbers of dogs, they could afford adequate staff and good food; they were not dependent upon sales of pet puppies to the public; such kennels were, in fact, a hobby and usually a great influence for good within the breed. During the war many kennels were closed down and staff called up and the stock widely dispersed to owners who primarily gave the dogs good homes and secondly, knowing they had a well bred animal, bred from it, using any convenient stud dog, thus diluting strains which had been carefully studied and well understood by the original owner, and so introducing breed faults and probably anatomical defects side by side. To-day large kennels are few. No one can afford to maintain a large stud and those who try to do so often end with a collection of mediocre animals. As a result champion studs are scattered over the country in various establishments, relatively few lines are left which still breed true to type and it seems to me that various hereditary defects have become widely scattered too. I must be fair and add that some defects may have similarly decreased as I fancy I see rather fewer luxated lenses in Terriers and less herniae in several breeds. Carriers of certain recessive defects must be widely scattered in the more popular breeds and control thus far more difficult to achieve.

Control

To achieve adequate control of hereditary defects it would be necessary to discriminate against affected dogs in the show ring, since it is the well known prize winner which is the sought after stud and only rarely does an unknown dog achieve great eminence as a sire; in the latter event, however, an unknown dog used by knowledgeable exhibitors and breeders will usually have some outstanding virtues known and appreciated only by the discriminating hence relatively little harm is done.

It is difficult to understand the attitude of the autocratic ruling body of the dog fancy, the Kennel Club, particularly in relation to the previously mentioned directive to judges on cryptorchidism. Superior or inferior prognathism is a fault in most breeds though it may have little effect on health, yet such exhibits are allowed to be penalised. A blind dog may not be shown, nor may a castrated dog nor a spayed bitch; yet a dog with no visible testes may become a champion—how does the judge know he is not a castrate.

Entropion in Chows is common and many breeders do their best to eliminate it from their stock. Most judges penalise a dog shown with severe entropion and the Kennel Club does not say us nay, yet see how many testicles he has and we are offending. Defects such as entropion which are susceptible to surgical correction become masked and their elimination correspondingly more difficult, but some uniformity of approach to the matter of hereditary defects would be of inestimable service to the dog community. Is it too much to ask?

I am not at all sure, in fact, that this attitude on cryptorchidism is not a negation of one of their own show regulations, No. 5 (d). This reads:

5. Disqualification and Forfeit of Prizes.—A dog is liable to be disqualified from winning any award by the Committee of the Kennel Club, whether an objection has been lodged or not, if proved among other things to have been: . . . .

(d) Totally blind or afflicted with a tendency to reproduce any hereditary disease, defective in hearing, castrated, spayed, or otherwise prevented from breeding as the result of a surgical operation.

Surely we as a profession must say that show dogs, which are to be the mainstay of a breed, must primarily be sound animals of normal anatomical structure (I do not refer to breed peculiarities of features, etc.) before show points are considered? In this our allies are the so-called all-round judges who, in my opinion, perform a most valuable service to the dog fancy by putting soundness first and minor breed fads a bad second.

I am afraid I have many times strayed from the point and ridden various personal hobby-horses, but in closing may I say again how much I have appreciated the honour of opening a discussion on this paper, and how strongly I feel that this profession has much to contribute in the field of canine eugenics.

THE GENERAL DISCUSSION

The Chairman thanked Dr. Young and Miss Joshua for the able way they had presented and opened the paper. The subject was a very interesting one and one which had been very neglected. He was a member of the General Committee of the Kennel Club and the subject of monorchids and cryptorchids had been discussed on many occasions. He thought that the correct approach to the Kennel Club would be for the British Veterinary Association to write to the Kennel Club and ask if they would meet a small deputation from them to discuss this matter. The Kennel Club was composed of common sense people who would, he felt sure, listen to what they had to say with sympathy.

A member said he had much pleasure in moving that resolution, he thought a great many of these anomalies could be overcome.

Another member asked if Dr. Young could say what would be the effect on breeding of a dog carrying a recessive gene.

Dr. Young said the first thing to do about any defect was to investigate its mode of inheritance. If a defect was due to a recessive its elimination by preventing dogs showing it from breeding would be slow process. The difficulty was to eliminate the carrier since this would mean eliminating a large number of dogs from the breed. If, however, dogs actually showing the condition were penalised and breeders refrained from using them, there would be a slow reduction of the condition over the years, especially since leading breeders would then tend also to avoid using well-known carriers.

The Chairman said that the veterinary surgeon had the last word on veterinary matters at all dog shows.

Dr. Young commented that it was rather strange that a dog with only one testicle could be passed by a judge. If a dog had extremely good other points it might be justifiable to use him if he was a cryptorchid but generally he should be heavily penalised and weighted against.

Miss Joshua said that it was not a matter that they should not be penalised, but the Kennel Club had issued a directive to judges that they must ignore any form of cryptorchidism. It was not left to their discretion; this particular defect was picked out.

Professor Weipers asked if the matter should be referred to the Technical Development Committee. It was not constitutional that this meeting should pass a resolution, but it could ask that the Council should consider the matter.

The Chairman agreed that it would probably go to the Technical Development Committee in any case. It had already been discussed by that Committee and the Chairman of that Committee was with them to-day and might like to say something on the subject.

Professor Weipers asked if the meeting agreed with his course.

Mr. G. M. G. Oliver (Lanchester, Co. Durham) seconded the proposal and suggested that it should be brought forward at the forthcoming Council meeting as an urgent matter.

This procedure was generally agreed to.

Professor Pugh said that during the war he found himself on a local committee formed to raise funds for the use of the Red Cross in China.

The committee organised a sale of antiques and other things for this purpose. As Madam Chiang Kai Shek had been invited to open the affair a small parade of local champion Pekingese was arranged for her. She showed great interest in them but said that the Chinese had for many centuries appreciated the fact that a bitch with a very flat face and short "cobby" body mated to a similar male would produce many cleft-palate puppies. She said that they liked to be able to lay the side of their little finger on the top of the nose and they certainly liked longer bodies than we seemed to wish for in our champions.

There was another hereditary defect seen chiefly in the wire-haired terrier group—spontaneous dislocation of the lens of the eye. This condition was becoming prevalent in Sweden after the war as a result of the use of a certain family of terriers. Recognising the dangerous effect to the breed of perpetuating this defect, the breeders themselves agreed to destroy or sterilise the offenders. He was assured a few weeks ago by a Swedish veterinary professor that the condition seemed to have disappeared and that such cases were no longer presented to the clinic.

The Chairman said that the Kennel Club legislated so that they did not completely obliterate the whole of the Irish Setter show specimens but did so in such a way that the breeders were forced to alter their breeding programmes with the result that to-day it would be difficult to find an affected animal. It was easy to criticise the Kennel Club, but they too had their difficulties.

Miss Marion Freak (Potters Bar) wished to add her thanks to those of Dr. Young and Miss Joshua. Dr. Young had given an extremely wide and balanced review and Miss Joshua effectively drew attention to what could be done now and in the future on practical lines to reduce the incidence of some inherited defects.

She would like to comment on the general question of achondroplasia, particularly taking up the point mentioned by Professor Pugh of disc-protrusion. Hanson listed the French bulldog and the Peke in his review of this lesion and stated that the initial chondroid changes in the disc occurred before actual protusion. Changes in the nucleus pulposus, already present in the majority of one-year-old animals, and by two-year-old 50 per cent. of the dogs were showing some calcification. On the other hand, in other breeds (not achondroplastic) he found that it was not until seven years old that the initial fibroid changes appeared. They took place much more slowly and true degeneration was only present in very much older animals. She believed Smith and King in THE VETERINARY RECORD, speaking on disc changes, said that the achondroplastic breeds had degenerated discs. Miss Joshua commented on the article by Tuck and Miller recently in *The Veterinary Journal*. These two authors appeared to go considerably further and linked the early appearance of various symptoms, from fits and hypoesthesia in skin areas, to paresis with what they termed "chondrodystrophia foetalis." She was not sure what was meant by that, was it merely early and marked achondroplasia? Tucker and Miller suggested that these symptoms occurred before there was actual disc protrusion and that in the very severe form it did not affect whole breeds but ran in families.

It seemed to her when considering this question that the vital point was whether all members of achondrodystrophic breeds were susceptible? Was it possible to breed the Pekingese or French bulldog or a Dachsund without this early degeneration of disc, and particularly could it be done in the Cocker Spaniel which was not an obviously achondroplastic type?

Regarding the Scottie pelvis, Miss Joshua had asked her some time ago whether she thought that absolute oversize puppies were becoming less frequent and she had then agreed. This rash statement was followed by a case of absolute oversize a day or so later. She would suggest that in addition to the pelvis the head was implicated, she did not suggest that it was abnormal in structure but that for the size of dog it was abnormally large. She thought a comparison between the West Highland, the Cairn and the Scottie heads and pelves might be very illuminating. She agreed that the Scottie breeders were not ready to accept that the short-legged type now in vogue must lead inevitably to whelping troubles. If the breeders insisted on these excessively short-legged Scotties there was not much that we could do about it but if they would return to the type with the longer legs the bitch would not be in labour all night to no effect.

There were one or two minor comments. Dr. Young mentioned deafness associated with a particular colour (merle and white). She was interested to meet recently a black miniature poodle, which was congenitally deaf. When she discussed with the breeder the question of possible hereditary deafness that breeder expressed the opinion that deafness in blacks in certain females of miniature poodles was well known. She would be interested to know whether any other member had had the same experience that deafness was associated with a particular colour or whether it only happened with one or two females in the miniature poodles. She would agree that Perthe's disease occurred mainly in the short-legged breeds but had seen it in the Wire Fox-terrier.

Mr. Townson said that first of all he was going to disagree with Dr. Young on one of his comments about one particular breed, the bloodhound, which he himself had bred for a few years. That breed had not altered since it came to this country with William the Conqueror. Their heavy, floppy ears and wrinkles round the face were there for a definite purpose—to protect the face and the more sensitive parts when hunting. He thought one was inclined to forget in all breeds the object of the breeds, that some "defects" were not defects at all, they were present for a definite purpose. If the breed and its history was carefully studied one found that was the case. Unfortunately breeders had gone out for something which looked pretty instead of something which was useful.

Another comment Dr. Young made was that the bloodhound was susceptible to distemper complex. Again he could not agree. No particular breed was more susceptible to distemper than any other. He would like to ask whether Dr. Young considered there might be a close relationship between the diseases of new-born puppies and that of canine type hepatitis.

Going on to dystokia he had noticed of recent years that 90 per cent. of cases had not been due to pelvic abnormalities but rather to a primary or secondary inertia. This must be a hereditary defect and something which must be bred out. He had also noticed an increase in the amount of renal troubles in Poodles.

He failed to understand why a breeder who had a wire terrier with a hook tail should be disqualified when, if it was straightened out, the dog could become a champion.

Mrs. Rosemary Welch (Rickmansworth) said that she had been inspired by the way Miss Joshua dealt with this subject. She thought veterinarians could have much more influence on the breeding industry if by tact and various methods in many directions, even to the extent of advising the ordinary man in the street about the kind of dog he should keep, they made their views known. One was often asked by clients what sort of dog they should get; they did not always take the advice, but even so it was possible to give sensible advice. The Kennel Club said that they must have proof that a defect was hereditary before they would do anything. When the Horse Breeding Act and the Licensing of Bulls Act came into being the breeders took the advice of their experts

in spite of the fact that some diseases in the former Act have never been proved to be hereditary, and the breed improved accordingly and she did not see why the Kennel Club should be so dogmatic.

On the point of the Boxer and cryptorchidism she knew of a well-known boxer which was a monorchid, had seen several of his litters and looked out for the condition. Most of the whelps were brought by dealers and they went out of her area and she had been unable to trace them but at last she had found the condition in a second generation, the best puppy in the litter was kept by the breeders, he was monorchid until he was three months old, she thought the cord would always be short on both sides, he was a potential show dog and a potential stud dog. Another dog in the same litter had no testicles, either visible or palpable, at eight weeks it was sold as a pet and might be traceable.

While the British public was sentimental to the point of lunacy in some things to do with animals, anything difficult to understand was not thought about. Many of these hereditary defects caused a frightful amount of pain but there was nothing obviously cruel about keeping the animal alive. She exemplified blindness in Pekes and other breeds, cataract in Scotties and luxation of the lens in wire-haired terriers at three or four. When one realised that this could be caused by wrong methods in breeding it was very bad. Incipient lunacy in cockers and dachshunds caused a good deal of trouble, not so much to the owners but to neighbours and to us, some pulmonary and cardiac defects were entirely due to the abnormal anatomy of some dogs. Paralysis in long backed dogs was another example. These abnormalities would not be tolerated in any other species but in the dog they were prized. She had tried to talk people out of breeding to this point or that but it did not seem to do very much good.

In the last paragraph but one of the paper there was a brief dismissal of the idea of trying to breed resistant strains in dogs but she thought that could be done. It had been done in the past with tremendous benefit to the plant and agricultural industry and she was sure it could be attempted in the dog. Some breeds were very susceptible to certain diseases, far more than others.

The only idea she had of anything which could be done to prevent some of these defects being perpetuated, and perhaps a fairly simple one if it was tactfully handled, would be a Licensing of Dogs Act whereby it would be illegal to charge a stud fee for any dog unless it was passed by a veterinary surgeon as being suitable for breeding, regardless of its status on the show bench. If this whole problem was attacked from the money angle some good might be done.

In conclusion she might misquote Munnings who said he "liked a tree to look like a tree" and say that she liked a dog to look like a dog.

Miss Scutt (Christchurch) said that she had had some very interesting cases of Scotties in Christchurch which had been traced to a brown dog although all the puppies were black; the defect was in the one family but in one case it was a little removed from the original dog, although it was in the pedigree.

Was the hair in the ear of the poodle normal or abnormal? She had never seen a poodle without hair in its ears. Was Scottie cramp hereditary or not? She had found in many cases that it was and she did not think Scottie people took enough interest in eliminating it from the breed.

Professor W. L. Weipers (Glasgow) said that there was a good deal of talk nowadays about preventive medicine for large animals and the small animals were forgotten. He thought one should advise people very strongly that defective animals should not be used for breeding; steps should be taken to see that some frightful condition was not perpetuated. For example abnormal conformation could be responsible for dystocia. He remembered this condition in Scotties and knew of one family where four generations had required the assistance of caesarean sections at birth. The pups had enormous heads and the dams the type of pelvis which was being sought after in the showroom. The better the animal the more likely would operation be necessary to help to deliver the pups. This breeding policy should be given a great deal of thought, a mass of evidence could be brought to bear to show breeders that they should not do this kind of thing.

Miss W. M. Brancker (Sutton Coldfield) said that a resolution similar to the one now proposed was considered during last year by the Technical Development Committee and a considerable amount of time was spent in trying to produce suitable evidence to take before the Kennel Club, the feeling being that it would only be right to approach that body with hard facts.

A number of experts in this and other countries were approached, including Dr. Young, and although these experts agreed that such defects appeared to be hereditary none of them could be persuaded to make such a statement in writing! A number of people in practice who had stated that they had evidence were approached, but the evidence never materialised.

She had listened with considerable interest to the discussion, she thought all were in agreement that something should be done and if all the speakers were certain of their facts she would ask that they should be put down on paper and sent to the office of the British Veterinary Association.

Mr. G. M. G. Oliver (Lanchester) said that points had arisen regarding the examination of dogs at shows. The crooked tail in a rough-haired terrier had been mentioned together with the operation which enabled it to be shown. In the north of England there were few rough-haired terriers who had not had their tails straightened; a certain veterinary surgeon was a perfectionist in this performance. These things were very disturbing. Cryptorchidism had been on their minds during the afternoon, and it had been said that the Technical Development Committee had considered it, so that that Committee would know the other side of the matter which they in that room did not understand. Miss Joshua had spoken of what happened in the Kennel Club, but the ordinary person did not know what happened there.

Mr. J. W. Heney (Dublin) said that there were a few points which he would briefly mention and perhaps the meeting would like to hear the position with regard to these conditions in Dublin.

Haemophilia appeared to be extremely common. His own experience was that this condition was always found in the Scottie. How did one know when one was dealing with haemophilia or with just bad haemorrhage? He might be very ignorant in putting that question.

In the Dalmatian breed one saw urinary calculi so often; when was it to be considered hereditary?

He agreed that one found a preponderance of hair inside the ear in some breeds, particularly Poodles.

One saw many cases of posterior analysis in the smooth-haired Dachshund; should it be considered hereditary.

Mr. Hickson (South Africa) said that in South Africa and Rhodesia one had been faced with a problem very much on the line of the defects which had been mentioned and he would like to speak of the experience of the Kennel Club ruling. In South Africa there was a breed of dog known as the Rhodesian ridge-back, some members had seen it, it had a curious ridge along the back in the form of a cyst. Occasionally something happened and the ridge might not be present but it might return and came out between the withers and the neck. It had a deep lining with hair which ran down from the coat surface to the cervical vertebrae. Frequently it remained inactive and then became active and formed an abscess and fulminated. After 1945 there was a good deal of trouble with this condition and the Rhodesian Ridge-Back Society laid down a rule that any breeder who saw this condition in any of his animals should not breed from them, either bitch or dog. That ruling was acted upon at the beginning and for the ensuing six years or so there was a great diminution; but within the last two or three years it had reappeared which

seemed to indicate that some of the breeders were not complying with the ruling. The condition was serious in that this ridge-back cyst was being seen in dogs which had not the slightest resemblance to ridge-back dogs; the parents were not ridge-backs, nor, probably, the grandparents, but somewhere there was a ridge-back strain and he suggested that it would be very difficult to make any pronouncement and hope for any success in rooting out some these evils. They reappeared in odd guises or would do so if experience here followed the pattern seen in South Africa.

Mr. Potter (South Shields) said that he had a breeder who had ridge-backs and nothing was known about the cysts until they appeared in one litter. The cysts were removed and the puppies were sold throughout the country. He had not been able to trace any of them and did not know if the cysts had recurred.

The Chairman said that the ridge was a dominant factor following *mesalliances*.

Mr. Hickson agreed. He said he had found the condition where there had been a *mesalliance;* he had seen it in a Labrador and in spaniels. It was creeping away from the neck region and appearing in the frontal region. Sometimes there was a crop of these cysts and this entailed very careful dissection. A main cyst might have not less than five or six branches and each of them might run to the cervical region. If only a microscopical piece was left there would be a recurrence of the abscess.

The Chairman said that, like other speakers, he believed there had been a great increase in these co-called hereditary factors. He wondered whether that increase had anything to do with the fact that in 1939 about one million dogs in this country were destroyed. There was a great demand for dogs after the war when things settled down, and breeders began to breed dogs like sausage machines; they could get £25 to £30 for puppies straight out of the nest.

There was one condition which had not been mentioned to-day and that was the condition known as "the spinner." One saw it in wire terriers, they ran round and round chasing their tails. Another condition was that of phantom pregnancy, he had seen it in Great Danes particularly where there was a close relationship. Was that hereditary? He did not know the aetiology of the condition but it did seem to be a possibility that there might be some hereditary factor.

Miss M. V. Levie (Bristol) said that one found "spinners" in the breed she was interested in—Dandie Dinmont Terriers. She had a bitch who did it.

She would like to ask Dr. Young to what extent he thought heredity played a part in the temperament of a dog. She was interested in a breed of terrier which was normally very good tempered but there was the odd strain of fierce dogs. With regard to susceptibility to virus infection she noticed when she was in practice—she kept no definite statistics, there was no time to keep such things—there was a definite susceptibility to distemper, especially the nervous symptoms, in the long-nosed breeds.

With regard to the deaf black poodle she saw a case recently of a miniature poodle ten months old who was deaf. She thought he was bred in Somerset but she did not see the pedigree.

Dr. von During (Berlin) said that she was interested in the deafness of the black poodle. This had been one of the most favoured of pet dogs in Germany for the last six or eight years. For the last four years it had been dominant and one saw a lot them but she had never seen a deaf miniature poodle. It might be possible to discover to which tribe the deaf poodles belonged and it was possible that that family had not been imported from England to Germany.

Another question was that relating to distemper complications. Rough-haired, and long-haired dogs, the English setter, the long-haired dachshund, and the Irish setter had lost much of their dignity. They had been "improved" into elegant town dogs and tended to have nervous distemper more than other dogs.

The question of phantom pregnancy in bitches had also been mentioned and she was sure that this was hereditary. Bitches would show it before having a litter after the very first heat. It was analogous with the condition in big bitches who would not go into heat in time. It was thought that might be explained by the effect of food in the war but the condition continued and had been observed since.

Mr. J. S. J. Lauder (Altrincham) said that he had one particular kennel of Dalmatians where there was a great deal of trouble with persistent recurrences of bladder stones in both dogs and bitches and it was traced to two stud dogs. He thought it was definitely hereditary because once the use of these dogs was stopped and a different strain employed the incidence dropped with remarkable rapidity.

Professor W. L. Weipers said that there was a family of Irish terriers which showed this defect, it seemed to be one strain which was affected and the defect was transmitted to some of the dogs. There was no record of this trouble in the bitches. He had also experience of uric acid calculi in Dalmatians.

Mr. Lauder added that the stones were not analysed, the two stud dogs in use were completely unrelated and stones were produced by both dogs and bitches.

Mr. Jackson said that progressive retinal atrophy was only attributed to the Red Setter. In his part of the country there were a large number of Labradors who appeared to have a similar retinal condition and he wondered if Dr. Young could say whether such blindness was hereditary in the Labrador.

Mr. Daniel said that his practice was an agricultural one and his observations were based on a limited number of dogs. He would like to know if any one had any long-term figures on the incidence of Scottie eczema and the possibilities of heredity in demodectic mange.

Mr. Price, with regard to skin conditions which might be inherited or acquired, said that from his limited experience it appeared to him that dogs which were subjected to trimming and clipping tended to develop dermatitis. It seemed to be a bugbear in the Scottie particularly. There was a sudden moulting, not the bi-yearly moulting, in the crosses between the long- and short-haired dogs.

Mr. Townson said that unfortunately dogs did inherit defects, one of which was acute distension of the stomach which was invariably fatal. He had tried to trace it in his comparatively small practice.

THE REPLIES

Miss Joshua, in reply to the discussion as far as it concerned her opening, said with regard to the proposed resolution to be sent from the meeting, that it was quite proper for an open meeting of a scientific congress to put forward a resolution to be considered by the Council of the body concerned. There seemed to be unanimity of feeling in the meeting on the points raised and she saw no reason why it was necessary to wait for facts and go "cap in hand" to the Kennel Club. The meeting was entitled to express an opinion and to pass a resolution based on that opinion.

In reply to Mr. Townson's remarks on kidney trouble and poodle clipping, she understood that since the days of Louis XIV poodles had been clipped over the loins so that they could be easily dried after hunting, thus avoiding kidney trouble! Entropion caused a disease of the eyes and as such must be corrected on humanitarian grounds; whether dogs should be shown afterwards was a moot point. Wire fox-terriers, with crooked (squirrel) tails could not be shown; 90 per cent. of this breed in this country have been estimated to have faulty tails and these were corrected surgically if the dog was to be shown. She thought it was right to say that very few, if any, members of the profession carried out such questionable operations, but, despite the 1948 Act, a certain number of unqualified people continued to "nick" tails. It was an open matter but for obvious reasons, the wire fox-terrier fancy kept the matter closely under cover. The point was that no animal should be subjected

to a surgical operation for purely aesthetic purposes. She did not bring temperament changes into the discussion because it opened up such an enormous field.

On the question of the hair in poodles' ears, one surely had to consider what was correct for a species. There should be only a limited growth of shortish hairs in the ear and any development within a breed which created something different was abnormal. Scottie cramp occurred in certain strains which breeders knew, and some took steps to eradicate it. She agreed with Professor Weiper's remarks on surgical correction of conditions regarded as hereditary, but it was necessary to correct abnormalities in an individual on health grounds. She now had very few Scottish terrier breeders as clients owing to the firm line she took over caesarean deliveries. In her view it was quite wrong deliberately to put a bitch in whelp a second time if, as often happened, it was learned that caesarean section would again be necessary. The first caesarean must obviously be carried out for the purpose of saving life.

Similarly with herniae, the condition should be corrected for the benefit of the individual animal but she always pointed out to breeders the hereditary nature of the condition and she had obtained quite a degree of co-operation from them in that they sold the affected dogs as pets only. Pseudo-pregnancy certainly ran in strains; it was a question of degree but one was on difficult ground in trying to draw a line between what was a normal physiological condition and what was not.

On the question of skin condition in the Scottie, it seemed that the Scotch terrier was unable to get rid of skin debris itself; it was, in fact, just a dirty dog and should be bathed regularly.

Demodex was in her opinion a true hereditary disease, but this statement was based on rather little evidence. In one case the puppies were taken from a known infected demodex bitch and they were nursed by a long-haired clinically clean bitch, one puppy being left with the affected dam for obvious reasons. The puppies which were put on the demodex-free dam were severely affected, whereas the other was not; had it a greater resistance? This seemed to suggest that the parasite was transmitted *in utero*.

Dr. Young, also in reply, said that there were two schools of thought with regard to the overall picture of hereditary defects. One tried to make a firm effort to eliminate them by various forms of legislation. The other was inclined to say that the breeder should be able to do what he wanted with his own animals. Unfortunately little was known about genetic defects in dogs and it might be that many of these "defects" were associated with good characteristics. Gene action was a complex affair and in some cases the heterozygote might have an advantage over the normal. One had to maintain a balance between the two schools. It seemed to be agreed that cryptorchidism was hereditary, and it seemed to be widespread and probably measures should be adopted to reduce its frequency.

Many diseases had been mentioned and he had been asked whether they were hereditary or not. All he could say was that one had to make up one's mind on the evidence available, and, in the absence of scientific knowledge, the approach to any particular problem must be based on common sense and clinical experience. It had been interesting to hear the large number of conditions mentioned in the discussion.

With regard to breed conformation affecting birth conditions, it was difficult to express an opinion. Several speakers had condemned the achondroplasiac trends which produce difficult whelping. If the breeders wanted to produce that kind of anatomical structure, the profession should certainly warn them of probable consequences. Whether surgeons should operate or not in such cases was a matter on which each would have to make up his own mind.

How did anyone know when they were dealing with a haemophiliac? It generally only affected the males, and half the males in the litter would be affected. The condition described in Dublin was suggestive of the condition.

Temperamental tendencies he thought had a definite hereditary basis, as indicated by breed differences in behaviour. He had no desire to indite any particular breed, all breeds had their skeleton in the cupboard.

He had enjoyed the discussion very much and thanked the members for their contributions.

The Chairman thanked Dr. Young and Miss Joshua respectively for the paper and the opening of the discussion. Perhaps he might give a word of warning. There were many hereditary factors in dogs and always would be, but they must not let this fact get out of proportion. The right approach, he believed, was to attack the tendency when it was seen to be getting out of hand.

Current Literature

DIGEST

Intramuscular Iron Therapy

The authors point out the valuable though limited field of intravenous iron therapy and draw attention to the wider application of intramuscular iron therapy could a suitable preparation be elaborated. The desiderata of such a preparation should be that it is an effective haematinic freely absorbed from the tissues and non-irritating. They then describe their experiences with a new dextran-iron preparation which they have found highly satisfactory for intramuscular use. This preparation was administered to 15 human patients suffering from iron-deficiency anaemia. The criteria on which the anaemia was judged to be iron deficient were low mean corpuscular haemoglobin concentration, low serum iron and absence of stainable iron in marrow puncture. Though the optimum dosage schedule is still under consideration, 200 mg. contained in 4 ml. every other day proved satisfactory. No reaction other than slight local tenderness was ever experienced. A significant rise in serum iron was demonstrable less than 18 hours after the initial injection. In every patient a satisfactory rise in the haemoglobin took place. The packed cell volume was more rapidly restored to the normal range than the haemoglobin, the effect of this being to delay considerably the restoration of the mean corpuscular haemoglobin concentration. The rate of increase of haemoglobin varied, but in general was greater in young severely anaemic patients.

★

Fifty pregnant women with iron-deficiency anaemia were treated with the dextran-iron preparation given intramuscularly. The dosage schedule varied but some patients only received twice weekly injections. Utilisation of the iron was good, the haemoglobin increasing on an average by 0.3 g. for every 100 mg. of elemental iron injected. G. F. B.

(This dextran-iron compound suitable for intramuscular injection might be useful in the control of piglet anaemia. The compound used was " imferon " made by Benger's Ltd.)

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SCOTT, J. M., & GOVAN, A. D. T. (1954). Anaemia of Pregnancy Treated with Intramuscular Iron. *Brit. med. J.* Nov. 27th, 1954. 1257–1259. 4 figs. 11 refs.

Propylene Glycol in the Treatment of Bovine Ketosis

Most cases of bovine ketosis in Ontario occur during the stable feeding period but in dairy cattle practice many cases are encountered in cows on pasture, usually highly productive cows. A high proportion of cases occur within 60 days of calving. The "digestive" type is most commonly encountered, the "nervous" type is relatively infrequent. Highly productive cows are most susceptible to the severe forms of ketosis, especially if these cows have had a long dry period and thus freshen in good condition. Most dairy cows get little or no exercise during the winter months. It is possible that lack of exercise plays a part in the aetiology of ketosis.

In planning a trial of propylene glycol in the treatment of ketosis it was felt that the dosage should be adequate to give a rapid response but the cost of the drug must be considered. Eight of the cases treated were primary and two were complicated by metritis. The propylene glycol was given by mouth. Drenching is preferable as even when the cows were eating concentrates they did not eat a mixture of propylene glycol and part of their ration. Seven cases were treated with 250 g. (approx. 8 oz.) twice daily for four days while three were given 125 g. twice daily for four days. Recovery took place in all cases. The higher dosage level gave better results than the lower level. It is felt the response to the lower dosage level was too slow for routine use in farm practice. The response to treatment was assessed on the criteria of appetite, milk yield, blood glucose, blood ketone values, but in addition blood calcium and blood inorganic phosphate values were estimated.

One cow that made a good recovery relapsed after eight days when a sudden change of food was made—grass ensilage being discontinued. It is stated that relapses are liable to occur if, when treatment is discontinued, the cow is not assimilating sufficient nutrients to balance the output for maintenance and lactation. Propylene glycol is glucogenic but has no other therapeutic action. It may be advisable to give dextrose intravenously in severe cases immediately to raise the blood sugar and then follow with propylene glycol by mouth.

"When a veterinarian detects the ketosis syndrome, he should still make a thorough clinical examination of the cow, for it has been estimated that 30 per cent. of the cows diagnosed as ketosis do not represent primary ketosis."

G. F. B.

Reference

MAPLESDEN, D. C. (1954). Propylene Glycol in the Treatment of Ketosis. *Can. J. Comp. Med.* **18**, 287–293. 2 tables. 1 fig. 10 refs.

Phenothiazine and Warbles

A group of three calves, kept at pasture, and allowed free access to a mineral mixture containing phenothiazine, produced a total of 11 warbles, while a second batch of three calves, maintained under similar conditions, but allowed the mineral mixture minus phenothiazine, raised 82 warbles. When the trial was repeated next year, using groups of six animals, 49 warbles were counted on the phenothiazine treated animals, as against 216 on the untreated. The daily individual phenothiazine intake throughout the period of the trial varied from 0.1 to 3 grammes. Schwartz, who made these observations, suggests that the reduction in the number of warbles might be the result of a larvicidal action by absorbed phenothiazine, or its metabolites.

Neomycin and Calf Scours

The effect of the antibiotic neomycin in the treatment of calf scours due to *Salmonella dublin*, is the subject of a paper by Dickson. A group of 180 heifer calves, six to eight weeks old, were affected with diarrhoea, associated with a high temperature. Faecal samples revealed the presence of *S. dublin*, which was found to be resistant to a number of antibiotics, but sensitive to neomycin. This agent was therefore given by mouth to the affected animals, at the rate of 1.0 gramme every 12 hours for three days, when the dose was reduced to 0.5 gramme per day. Thirty-three out of forty of the affected calves recovered after three to seven days' treatment. The remaining seven, and all the untreated calves, died. In his comments on this outbreak, the author makes the point that the symptoms observed were not different from those of the other types of calf scours. The distribution of *S. dublin* infections in calves is confined, in the U.S.A., to the region to the west of the Rocky Mountains.

A Magnet for the Prevention of Traumatic Gastritis

The oral administration of a cylindrical magnet, composed of aluminium, nickel and cobalt, ½-inch in diameter, and 2 inches long, is suggested by Cooper as a means of reducing the incidence of traumatic gastritis in cattle. The purpose of the magnet, after it has gained access to the rumen, is to collect any miscellaneous pieces of ironmongery, and thereby restrain their migration through the wall of the rumen or reticulum. A satisfactory 'pick-up" was demonstrated in the rumen of beasts which had received the prophylactic magnet, and were subsequently subjected to a diet of nails. In the introduction to his paper, Cooper observed that 70 per cent. of some 300 animals gave a positive reaction when tested with a metal-detecting device. This high incidence of metal in cattle also forms the subject of the editorial of the *J.A.V.M.A.* in which it is noted that during the period 1948-53, over 30,000 cattle were reported by the Federal Meat Inspection Service as suffering from damage due to the ingestion of metal objects. Further statistics are quoted, which reveal that over 90 per cent. of this damage was caused by wire and nails. The incidence per cent., among the organs damaged was: stomachs 58 per cent., diaphragm 28 per cent., and heart 8 per cent. Dairy cattle over two years old formed the bulk of the cases.

A New Pig Anthelmintic

A search has been made in recent years for an ascaricide for pigs which, in addition to being safe and effective, can be administered in the food. This last-named property is a particularly attractive feature because the pig is the least suited of all

domestic animals, anatomically and temperamentally, to being dosed by hand. Some evidence of the results of this work is provided by current British reports on the anthelmintic properties of piperazine adipate, and piperazine carbon disulphide. American investigators (Guthrie) have now introduced cadmium anthranilate as an ascaricide for pigs. Cadmium anthranilate is a white powder, insoluble in water, which was found to eliminate ascarids at a dosage rate of 1.5 to 3 grammes per pig, and can be added to the food. The margin of safety of the drug appears adequate, and is extended by the fact that excessive doses cause emesis.

The Closure of Abdominal Wounds

An abstract of a survey by surgeons (Mayo and Lee) of 146 cases of abdominal wound disruption in man, indicated that the breakdown of abdominal operation wounds is frequently the result of inadequate suturing of the peritoneum. An aperture in the peritoneal suture line is penetrated by the omentum, and the consequent inflammatory processes cause the wound to rupture. Subsidiary causes of this condition are insufficient abdominal relaxation due to poor anaesthesia, trauma as a result of the rough handling of tissue, and the use of chemical irritants. Through and through silk-worm gut sutures, tied over rubber tubing, reinforced, if possible with a closure in layers, is their recommended treatment for abdominal wound rupture.

Cortisone and ACTH in the treatment of Hard Pad

Cortisone and ACTH feature in a new approach to the treatment of hard pad disease described by Candlin. This author considers that the damage caused by the neurotrophic virus is the result of the invasion of epithelial cells. The cornification of the foot pads, nose, eyelids and lips, are quoted as an illustration of the results of this effect. It is theorised that cortisone and ACTH affect all body cells, in particular the epithelial cells, and therefore the use of these agents may aid in the regeneration of the cells which have been damaged by the virus. Candlin therefore used cortisone and ACTH for the treatment of advanced cases of hard pad disease. The cortisone was administered by mouth, in two daily doses of 25 to 50 mg., according to the weight of the dog. This dosing was continued for five days, when the cortisone was replaced by injections of ACTH, which were continued for a further five days at a dosage rate to 12 to 25 units a day, decreasing to 2 to 3 units, by the fifth day. The cortisone was used first to reinforce any impaired function of the adrenal gland, which was then stimulated by the ACTH. The author stated, however, that a good response followed the use of either cortisone or ACTH. Supportive therapy, which included antibiotics, vaccines and glucose saline, was also used. This treatment was applied to a total of 51 cases. A satisfactory response was observed in 27 out of 30 dogs which had not developed nervous symptoms; however, when there was evidence of involvement of the central nervous system only nine out of 21 dogs recovered.

D. W. J.

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GUTHRIE, J. E. (1954). *Ibid.* 413–418.
MAYO, C. W., & LEE, M. J. (1951). *Arch. Surg.* **62** *abs. N. Amer. Vet.* (1954). **35** (10). 757.
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The Victoria Veterinary Benevolent Fund

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at No. 10, Red Lion Square, London, W.C.1, on October 8th, 1954, when the following members were present:—

Mr. H. W. Dawes (President) in the chair, Major J. J. Dunlop, Mrs. Daisy I. Glover, Mr. G. N. Gould, Professors J. McCunn, P. E. Mullaney, L. P. Pugh, Messrs. J. N. Ritchie, A. Spicer, Capt. Wm. Watt, and Professor G. H. Wooldridge.

Mr. C. W. Francis, secretary, was in attendance.

Minutes

The Minutes of the previous meeting, held on June 18th, 1954, having been published were taken as read and signed as correct.

Apologies for Absence

Apologies for absence were received from Professor R. E. Glover, Mr. L. E. Hughes, Professor R. Lovell, Mr. G. P. Male, Professor W. M. Mitchell, Capt. T. M. Mitchell, Dr. R. F. Montgomerie, Professor C. W. Ottaway, Major C. W. Townsend, Capt. A. Whicher, and Major W. H. Wortley.

Correspondence

The secretary read a letter from the honorary treasurer of the Ladies' Guild enclosing cheques for £350 and £500, the former for Current Relief and the latter for the Special Gift Account, to be disposed of as in previous years.

The President and members of Council were deeply touched by these handsome contributions which they fully appreciated could have only been obtained as the result of much hard work on the part of the members of the Guild.

It was unanimously Resolved—

That the secretary be instructed to write an appropriate letter of thanks to Mrs. D. I. Glover, honorary treasurer of the Ladies' Guild.

Investments

The treasurer, Professor J. McCunn, reported that the Fund's holding of £403 7s. 5d. 3 per cent. National Defence Bonds, 1954-58, became due for redemption on September 2nd, 1954, and that the amount received was reinvested in the purchase of £442 17s. 0d. 3½ per cent. Conversion Stock.

It was Resolved—

That the action of the treasurer be approved.

Accountant's Report

The secretary read the following report which was approved, a vote of thanks being accorded to the respective donors:—

Since the previous meeting the following donations have been received:—

	£	s.	d.
"In Memory of Mr. C. E. Rix, M.R.C.V.S." Messrs. F. B. Halpin and J. Heath ...	1	1	0
Association of Veterinary Teachers & Research Workers	10	0	0
British Timken Show (Messrs E. G. Sutton & E. R. Cook)	1	1	0
Browne, V. A. D.	2	0	0
Cruse, H. E.	5	5	0
Elstead Horse Show (Mr. E. P. Barrett) ...	1	1	0
Lincolnshire & District Division	5	0	0
North of Scotland Division	10	0	0
Royal (Dick) School of Veterinary Studies Students Committee (Proceeds of Annual Ball)	8	0	0
Society of Practising Veterinary Surgeons ..	19	10	0
Whicher, A.		10	6
Windsor Championship Show (R. A. Willett & Miss J. Chaplin)	5	5	0
Collecting Boxes			
Combined Meeting of East and South East Midlands Divisions ... 3 0 6			
Joint Meeting of Scottish Branch and Scottish Metropolitan Division 2 11 0			
	5	11	6
	£65	4	0

Subscriptions by Covenant

Two new covenants have been completed by members, one for £3 3s. 0d. and the other for £1 1s. 0d.

Cases

No. 217. Widow. The secretary reported the death of this recipient which took place on September 9th, 1954, at the age of 84 years. She had been receiving assistance from the Fund since 1938.

No. 243. Widow, aged 47. One son, aged 24, and two daughters, 21 and 15. Son recently qualified as M.R.C.V.S., but now on national service.

This case having been reviewed in the light of recent information supplied by the recipient, *It was Resolved*—

That the grant be continued until the son has finished his national service when the case be further considered.

No. 254. M.R.C.V.S. Aged 52, five children. Discharged from sanatorium on August 4th, 1954. The secretary read a letter from the Almoner stating that this member was now working as an assistant, but was due for a further examination by the chest physician at the end of September. It was agreed that the Almoner be given discretionary powers in regard to the small balance which she still held of the grant made at the previous meeting, and that it be left to the Executive Committee to take any further action which may be considered desirable in this case.

No. 273. Widow, aged 45. On May 1st, 1954, the grant of £2 per week was discontinued on the recommendation of the scrutinising committee. In June, however, the committee requested a re-opening of the case, as a result of which it was decided to make a reduced grant of £1 per week. The recipient on August 31st applied for a further reconsideration of her case, pleading she was unable to carry on with £1 per week.

Professor P. E. Mullaney, having been advised of the contents of the recipient's last application, attended the meeting for the purpose of reporting the results of his investigations into this case, whereupon *it was Resolved*—

That a cheque for £20 be made payable to her immediately and that her original grant of £2 per week be restored as from October 1st. *It was further Resolved*—

That the case be again reviewed in three years' time when this lady reaches her 48th birthday.

No. 275. Widow, aged 49. Two sons, aged 19 and 17. Former on national service, and the latter, who is partially paralysed, training to be a philatelist.

Case brought forward for reconsideration as grant expired at end of September. *It was Resolved*—

That the grant of £3 per week be continued for a further 12 months when the case again be reviewed.

No. 285. Widow, aged 39, one daughter, aged four. The secretary reported that at the last meeting it was decided to continue the grant of £13 per month to the end of September. Details of the present financial circumstances were submitted and considered. It was agreed that Miss J. O. Joshua's kind offer to visit this recipient be accepted with thanks, and that the case be referred to the executive committee, with power to act.

No. 299. Widow, aged 59. Husband died July 19th, 1954. Case considered by the executive committee who made a grant of £3 per week for three months, which expired at the end of October. *It was Resolved*—

That the action taken by the executive committee be confirmed, and that the grant be continued for 12 months or for such period as the executive committee deems it necessary.

No. 300. Widow, aged 85. Husband died in 1905. Receiving small pension from S. African Government. Hospital at which this applicant is receiving treatment for osteo-arthritis strongly recommended that it would be of great benefit if she had a change of air, and the Almoner asked if the fund could help towards the cost of a three weeks' stay at a convalescent home. After careful consideration, the executive committee decided to make a contribution of 10 guineas towards such fees from the Special

Gift Account. It was agreed that the action of the executive committee be warmly approved and that a grant of 10s. per week be made in this case.

No. 286. M.R.C.V.S., aged 74. Married. Receiving help from the National Assistance Board and a small grant from the Fund. The secretary read a letter from this member dated October 5th. *It was Resolved*—

That the matter be referred to the executive committee with power to act.

Date of Next Meeting

It was agreed that the date of the next meeting be left to the executive committee who should, if possible, arrange it during the January, 1955, Quarterly Council Meetings of the Royal College.

Vote of Thanks

On the proposition of Mr. G. N. Gould, a hearty vote of thanks was accorded to the President for his conduct of the chair.

News and Comment

VACCINATION WITH S19 VACCINE AGAINST CONTAGIOUS ABORTION: CALF VACCINATION SCHEME

The Ministry of Agriculture and Fisheries announces that to meet increased costs the charge to farmers for calf vaccination under the above Scheme will be raised from 2s. to 2s. 6d. per calf as from January 1st, 1955. The 2s. charge has remained unchanged since April, 1950.

From 1944 when the Calf Vaccination Scheme was started to date, between 4,000,000 to 5,000,000 calves are known to have been vaccinated with S19 vaccine against contagious abortion. This protection has reduced very substantially the serious losses previously caused by this disease in milk and meat production. Vaccination continues to be of great importance to farmers, who are advised to have their calves vaccinated regularly.

Farmers who have not so far taken advantage of the Scheme are urged to do so. All herds are covered by the Scheme and any farmer can join by sending a postcard to the Ministry's Divisional Veterinary Officer. Copies of a pamphlet explaining the Scheme may be obtained on application to: The Secretary, Ministry of Agriculture and Fisheries (Animal Health Division), Hook Rise, Tolworth, Surbiton, Surrey (or 15, Moray Place, Edinburgh, 3), or from the Ministry's Divisional Veterinary Officer.

COMING EVENTS

Jan. 4th.—14th Ordinary General Meeting of the A.V.T. and R.W's. at the University of Liverpool Veterinary Field Station, Leahurst, Windle Hill, Neston, Wirral, Cheshire, 10.30 a.m.

Jan. 6th.—General Meeting of the Central Division, B.V.A., at the Royal Veterinary College, Camden Town, London, N.W.1, 5.30 p.m.

Jan. 12th.—Meeting of the R.A.V.C. Division, B.V.A., at Boots Pure Drug Co. Veterinary Science Division, The Priory, Thurgarton, Notts, 12 noon.

Jan. 12th.—Meeting of the Supplementary Veterinary Register Division, B.V.A., at the Council Room, R.C.V.S., 9-10, Red Lion Square, London, W.C.1, 1.45 p.m.

Jan. 13th.—Ordinary General Meeting of the South-Eastern Division, B.V.A., at the Royal Star Hotel, Maidstone, 2.30 p.m.

Jan. 27th.—Annual Dinner-Dance of the North of Scotland Division, B.V.A. (in aid of the Victoria Veterinary Benevolent Fund), in the Northern Hotel, Aberdeen, 7.30 p.m.

Feb. 10th.—Annual Ball of the Royal (Dick) School of Veterinary Studies in the Assembly Rooms, George Street, Edinburgh, 8.30 p.m.

B.V.A. QUARTERLY MEETINGS

The arrangements for January are:—

Wednesday, January 19th.

10.15 a.m. Organising Committee.
2.0 p.m. Home Appointments Committee.
4.0 p.m. Parliamentary & Public Relations Committee.

At 7, Mansfield Street, W.1.

Thursday, January 20th.

10.30 a.m. Veterinary State Medicine Committee.
2.0 p.m. General Purposes & Finance Committee.

At 7, Mansfield Street, W.1.

Friday, January 21st.

10.30 a.m. Council meeting.
At the Connaught Rooms, Gt. Queen Street.

PERSONAL

Births

BORLAND.—At Colne, Lancs., on December 19th, 1954, to Edith (*née* Gordon, M.R.C.V.S.), wife of Hew A. Borland, M.R.C.V.S., a daughter.

CURRY.—On December 16th, 1954, at Beverley, to Mavis (*née* Redpath) and Gerald D. Curry, M.R.C.V.S., a daughter—Jennifer Susan (sister for Anne Beverley).

MEIKLEM.—On December 18th, 1954, at "Airlie," 16, Hardhill Road, Bathgate, to Molly (*née* Evans), wife of R. K. Meiklem, M.R.C.V.S., a daughter, Sheena, a sister for Justina and James.

WATKINS.—On December 23rd, 1954, at 3, John Street, Portobello, to Margaret, wife of L. S. Watkins, M.R.C.V.S., a daughter.

Marriage

KEEP—LEVENS-ING.—On December 18th, 1954, at "St. Nicolas," Kings Norton, Michael Eric Keep, M.R.C.V.S., to Pearl Jane Levens-Ing, M.R.C.V.S. Mr. H. D. Keeling, M.R.C.V.S., was best man, and Messrs. J. E. Downes and C. J. Beesley, MS.R.C.V.S. were groomsmen.

GRADUATION CEREMONIAL AT EDINBURGH

At a Graduation Ceremonial held by the University of Edinburgh on December 17th, 1954, the following Degrees were conferred:—

Ph.D. in the Faculty of Medicine

George, Anwar Nagib, B.V.SC., M.S. (Cairo); Thesis: "The development and growth of horns of the sheep."

Dr. George is at present an Assistant Lecturer in the Anatomy Department of the Royal (Dick) School of Veterinary Studies.

Nisbet, Donald Ian, B.SC., M.R.C.V.S.; Thesis: "An investigation into the pathology and immunology of a dermatitis of sheep common in the South East of Scotland, and its comparison with similar conditions elsewhere."

Dr. Nisbet qualified at the School in 1944, and is now an Assistant V.I.O. with the Edinburgh and East of Scotland College o Agriculture.

B.Sc. in Veterinary Science

McAllister, Joseph, M.R.C.V.S.

Stokoe, William Milne, M.R.C.V.S.

These gentlemen qualified at the School in December, 1954.

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Derby. Ivy House Farm, Marston-on-Dove, Hilton (Dec. 18).

Leics. Grange Farm, Ashby Magna (Dec. 20).

Northumberland. The Low Farm, Whitfield, Hexham (Dec. 18).

Westmorland. Oak Farm, Great Strickland (Dec. 20).

Yorks. Manor Farm, Allerston, Scarborough (Dec. 18); Low Gill Farm, Thornton Rust, Leyburn; Fairview Farm, Reedness, Goole (Dec. 20).

Fowl Pest:

Norfolk. Norwich Road, Yaxham, Dereham; The Gables, The Heath, Horsford, Norwich (Dec. 17); Yaxham Road, Mattishall, E. Dereham (Dec. 18); Heath Farm and Rose Cottage, The Turn, Heveningham, Norwich (Dec. 20).

Somerset. West Buckland, Wellington (Dec. 18).

Swine Fever:

Cardigan. Old Cilgwyn, Adpar, Newcastle Emlyn (Dec. 21); Cefrigarn, Llangeitha, Tregarnon (Dec. 22).

Ches. Windy Harbour Cottage, Siddington, Macclesfield (Dec. 21); Cinder Lane, Snelson, Chelford, Macclesfield; Litley Farm, Aston by Budworth (Dec. 23).

Cornwall. Rose Hill, Ladock, Truro (Dec. 22).

Denbighs. Burton Lodge Farm, Burton, Rossett; Pwll-y-blawd, Llanferres, Nr. Mold (Dec. 20); Pentre Marlyn Farm, Cock Bank, Marchwiel, Wrexham; Rhos Farm, Llanferres (Dec. 23).

Devon. East Riddiford, Winkleigh (Dec. 21); Hursdon Farm, Sourton, Okehampton (Dec. 23).

Dorset. 66, Old Wareham Road, Newtown, Parkstone (Dec. 20).

Flints. Celyn Farm, Leeswood, Mold (Dec. 23).

Glos. Redhill Farm, Lydney (Dec. 23).

Hereford. Nine Wells, Marden, Hereford (Dec. 22).

Lancs. Brindle Mill, Brindle, Chorley (Dec. 22); Willowbank Farm, Littlemoss, Ashton-under-Lyne; Piggery off Longley Road, Pendlebury; Bradkirk Hall Farm, Wesham, Kirkham; Doe House Farm, Newburgh, Wigan (Dec. 23).

Leics. Glen Parva Barracks, Wigston, Leicester (Dec. 22).

Lincs. Council Piggeries, Queensway, Ruskington, Sleaford (Dec. 23).

Middx. Gravelpit Farm, Harlington Hayes (Dec. 23).

Monmouth. Haford Unas, Llanfyllin; Lower Sylfaen, Castle Caerlinion, Welshpool; Pennan Farm, Pontllanfraith, Blackwood (Dec. 23).

Salop. Llynclys Farm, Llynclys, Oswestry (Dec. 23).

Somerset. Rockville, Pitcombe, Bruton (Dec. 23).

Surrey. Bridge House, 3, Bridge Road and 66, Baker Street, Weybridge (Dec. 23).

Sussex. Mountjoy Bridge Piggeries, Westham (Dec. 22).

Worcs. Firs Farm, College Grove, Malvern (Dec. 21); Church Farm, Churchill, Kidderminster (Dec. 23).

Yorks. Laburnham Cottage, Rufforth, York (Dec. 23).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

FOWL PARALYSIS

Sir,—Considerable confusion has arisen concerning the classification and nomenclature of fowl paralysis and the various other conditions associated with it which have come to be termed "the leucosis complex." This may be partly attributable to the spate of writing, some quite uninformed, in the lay and scientific Press. In a paper to the Plenary Session of the recent World's Poultry Congress I stressed the very unsatisfactory position now prevailing whereby the term leucosis has become almost syn-

onymous with any of the forms of leukaemia, neural, visceral or ocular lymphomatosis and even osteopetrosis.

Statements pertinent for one or other entity have been interpreted glibly as generalisations and vice versa. Dr. J. G. Campbell, at the same Congress, put forward a plea for a classification consistent with the generally accepted pathological characteristics of these various conditions and I would like to support him most strongly.

Much of the confusion has arisen from a too ready acceptance of the results of earlier researches in the United States of America and elsewhere. Muddled thinking and irresponsible writing are also to blame.

Irrespective of pathological criteria it should have been obvious that fowl paralysis was a separate disease, distinct from the leucoses and osteopetrosis. The latter conditions were well known to those of us working in the poultry field before the appearance of fowl paralysis in 1929 and the succeeding years. I have consistently opposed the belief that these conditions were different manifestations of a common disease and it has been our invariable practice to attempt to provide a differential diagnosis.

Now some American workers go even further and consider that not only are fowl paralysis and the leucoses separate entities but that the neural and visceral types of lymphomatosis themselves are distinct diseases with different causation.

This is not the place for a lengthy discussion on methods of control and prevention of fowl paralysis. I have summarised these elsewhere (Wilson, 1954). One feels, however, that pending the results of further research, members of our profession would do the poultry industry a real service by directing attention to such measures as are already available. It is more popular and fashionable to cry for more and still more research but in a disease of this nature, at best, results must be slow. Meantime much could be achieved by conscientious practice of such procedures as isolation of chicks during the early weeks of life, the breeding from survivors of an outbreak or from birds which had remained healthy in conditions under which others had shown evidence of the disease. More elaborate methods such as progeny testing are available for pedigree breeders. Without these precautions the continued high incidence of the disease is inevitable with the almost universal use of pullet breeding for the supply of cross-bred chicks for commercial purposes.

Yours faithfully,

J. E. WILSON,

Veterinary Laboratory,
Eskgrove, Lasswade,
Midlothian.

December 15th, 1954.

References

CAMPBELL, J. G. (1954). Rep. 10th World's Poult. Congr. 193.

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ELECTROCUTION OF DOGS

Sir,—The R.S.P.C.A. very much shares the gratitude expressed by U.F.A.W. for the action of the B.V.A. in connection with electrocution, but our gratitude is even more extensive because not only is your Euthanasia Committee investigating this, but all other possible methods of destroying small animals. Indeed, the 1937 Report published by the B.V.A. has always been regarded by us as a classic, giving as it did the best scientific guidance up to that time.

Perhaps it would be as well to place the whole matter of the electrocution of animals in its proper historical setting. Ever since the passing of the Slaughter of Animals Act, 1933, U.F.A.W. have objected to both the use of the Electrolethaller for pigs and sheep, and to using electricity to destroy dogs and cats. The latest scientific investigation has shown that, properly used, the Electrolethaller is an effective and humane instrument, but we now know that the old type of electrocuting cabinet for dogs and cats was not so satisfactory, since discomfort or even severe pain may occur during a period of 10 to 12 seconds.

The attitude of the R.S.P.C.A. has always been that it will gladly obtain the best scientific guidance possible in all these matters. We never claim to be anything other than a lay society. In 1933 we employed the best scientist who could be found to investigate the use of electricity on pigs, and since the electrocution cabinet was introduced by the R.S.P.C.A. from the United States in 1912, two major modifications in the design for the dog cabinet have been made on the advice of scientists employed by the R.S.P.C.A. Some months ago, when your Euthanasia Committee raised doubts with us about the electrocuting cabinet, I at once offered, subject to the approval of my Council, that the R.S.P.C.A. should bear half the cost of further scientific investigations if the B.V.A. would do the same. We owe a great debt to Dr. Roberts for his patient enquiries, but until a cabinet is produced for dogs and cats which conforms to his findings, and also is, in its electrical features, up to the standard required by the B.V.A., we shall not be rushed into using electrocution for destroying dogs and cats. The B.V.A., by the setting up of the Euthanasia Committee, have obviated animal protection societies like ourselves going to the expense of engaging eminent scientists in connection with any enquiries of this kind, and we are strongly of the opinion that any findings that may be made should, as with all scientific knowledge, be freely available to all who desire to benefit by it, not least of all the animals themselves.

Yours faithfully,

A. W. MOSS,

R.S.P.C.A.,
London, S.W.1.

December 22nd, 1954.